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A study of "Theory U" and its application to a complex Japanese Maritime Self-Defense Force problem

Yamauchi, Yusuke

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THESIS

**A STUDY OF “THEORY U” AND ITS APPLICATION TO A
COMPLEX JAPANESE MARITIME SELF-DEFENSE
FORCE PROBLEM**

by

Yusuke Yamauchi

June 2014

Thesis Advisors:

Jim Suchan
Kathryn Aten

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JAPANESE MARITIME SELF-DEFENSE FORCE PROBLEM**

Yusuke Yamauchi
Lieutenant, Japanese Maritime Self-Defense Force
B.S, National Defense Academy, 2006

Submitted in partial fulfillment of the
requirements for the degree of

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June 2014**

Author: Yusuke Yamauchi

Approved by: Jim Suchan
Thesis Lead-Advisor

Kathryn Aten
Thesis Associate Advisor

William R. Gates, Dean
Graduate School of Business and Public Policy

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ABSTRACT

The more an organization develops complex systems to perform increasingly complex tasks, the more challenging problems become and increasingly difficult to solve. This thesis recommends to the Japan Maritime Self-Defense Force (JMSDF) a better framework to solve these complex, multisystem problems through systems thinking and a new approach to this way of thinking, called “Theory U.” This thesis describes the types of problems that require managers to change their approach to problem solving. In addition, the social science literature on systems thinking and Theory U is described and applied to a specific JMSDF complex aviation maintenance case. These theories provide a way for JMSDF leaders and managers to continue to re-conceptualize their approach toward complex, dynamic problems. While the usual management tools used by JMSDF focus on technical ways to solve complex problems, these theories support the creation of a learning organization by developing worker capabilities to solve increasingly complex problems. To cope with these increasingly complex problems, JMSDF may need to provide training to implement systems thinking and Theory U concepts in many of its organizations.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAR	After Action Review
ASD	Air Supply Depot
AW	Air Wing
AW	AgustaWestland
ESE	Earth Science Enterprise
FQ	flight squadron
HFN	Hastily Formed Network
IPT	integrated project team
JMSDF	Japanese Self-Defense Force
LCC	life cycle cost
MMC	Maritime Material Control
MRH	main rotor head
MSO	Maritime Staff Office
MSQ	Maintenance and Supply Squadron
NASA	National Aeronautics and Space Administration
NMCM	Not Mission Capable from Maintenance
NMCS	Not Mission Capable from Supply
PBL	performance based logistic
PDCA	Plan Do Check Act cycle
PI	Presencing Institute
QC	quality control
ROI	return on investment
SoL	Society for Organizational Learning
VOC	Voice of Cynicism
VOF	Voice of Fear
VOJ	Voice of Judgment

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I. INTRODUCTION

A. THE IMPORTANCE OF THIS THESIS

Both civilian and military organizations, such as the Japanese Maritime Self-Defense Force (JMSDF), have problems in their issue resolution systems. Although simple problems may be solved by specialists working alone, other problems require changing the problem solver's thinking approach as the situations around the problems change. Currently, these complicated problems span multiple systems and require issue resolution with multiple stakeholders. Furthermore, the more an organization develops complex systems to perform increasingly complex tasks, the more challenging problems, and their resolutions become. In response to the increasing complexity of organizational life, Theory U (Scharmer, 2009) may be able to help leaders and managers understand these complex, multisystem problems that require problem solvers to change their thinking approach and develop the knowledge, skills, and abilities to solve complex problems. Furthermore, this conceptual tool may create new approaches to solving future JMSDF problems.

Theory U is a social science theory based on systems thinking (Senge, 1990) management and provides explanations for continuing to redesign systems, including the problem solvers' thinking methods, by providing a unique conceptual framework. Tools of Theory U and systems thinking are currently used in the U.S. Army After Action Reflection Reports, as well as in business, government, and civil society, to develop and align both small and large scale systems. Proponents of Theory U regard it as a new way of viewing and solving problems. Their confidence in its value is based on the experiences of Otto Scharmer and his team of researchers as they were working with some of the world's most accomplished leaders and innovators to solve the complicated problems caused by misalignments in multiple organizational systems.

Theory U provides practical tools to solve multisystem problems in a unique manner, and involves changing the problem solver's thinking approaches and methods. Specifically, Theory U is a way of focusing on people's interior condition, which differs

from the usual way of finding a problem solution by observing and analyzing past experiences. In Theory U, people need to focus on this interior condition more and deeper, while withholding judgment based on past experiences. Theory U proponents claim that many leaders are blind to the importance of this interior condition awareness that helps solve complex problems. These proponents focus on how leaders can use this interior condition awareness to notice and change mental models to solve these types of problems. The following paragraphs will illustrate how this idea influences leaders' decision making.

Theory U may be a useful tool for JMSDF even though implementation could be difficult. It requires leaders and managers understand other stakeholders, particularly special project teams consisting of every stakeholder related to the causes of a problem. This theory may be challenging to implement in the JMSDF because commanding officers must make decisions quickly. Moreover, compared to civilian organizations, JMSDF works under a more rigid hierarchical structure. It is, however, very important to consider integrating this theory into problem-solving processes because it provides a broader perspective that enables managers and leaders to uncover the fundamental causes of problems. Without this perspective, an organization will continue to have the same or similar problems because it only focuses on the surface issues. Consequently, Theory U's conceptual framework can provide JMSDF with valuable information about complex organizational system problems and processes to solve those problems.

B. RESEARCH QUESTIONS

This research will focus on the following questions:

- What is Theory U and how does it differ from current problem-solving theories?
- Can Theory U be used by the Japanese Maritime Self-Defense Forces to solve complicated problems or as an approach toward solving future JMSDF problems?

C. METHOD OF ANALYSIS

This thesis will use systems thinking—as described in *The Fifth Discipline* (Senge, 1990) and *Theory U* (Scharmer, 2009)—as a conceptual framework to solve

complex organizational problems that prompt problem solvers to change their ways of thinking. A thorough literature review of both systems thinking and Theory U will provide an understanding of these approaches. To illustrate, Theory U will be applied to an aircraft maintenance and supply control case in JMSDF. This case study will be used to explain why JMSDF's plans failed in the short and long term and to determine if Theory U provides a useful framework for solving these types of problems. More specifically, assessment will be provided as to what organizational systems and system dynamics continuously impact JMSDF's problem solving behavior.

D. OVERVIEW OF THE RESEARCH

This research will be organized as follows:

- Chapter II introduces the types of problems that require a change of problem solvers' thinking approaches as the situation around the problems changes. In addition, this chapter introduces Theory U and systems thinking, a social science approach that focuses on self-transformation in order to solve complex problems.
- Chapter III introduces a case involving JMSDF's aviation supply and maintenance division. The organization's structure, culture, and general problems will be examined. In addition, the organizational systems and system dynamics that consistently impact JMSDF's problem-solving behavior will be discussed.
- Chapter IV analyzes JMSDF's aviation supply and maintenance case using Theory U, based on systems thinking. The purpose of this analysis is to determine the factors that contribute to the challenges facing JMSDF's problem resolution process through the use of Theory U as a conceptual framework.
- Chapter V makes recommendations and suggests new approaches toward solving JMSDF and other organizations' future problems.

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II. INTRODUCTION TO SYSTEMS THINKING AND THEORY U

It is essential to understand what kind of contemporary problems organizations have. There exist a variety of problems, including those that cannot be solved no matter how hard one tries, and those that repeatedly create similar situations despite the fact that they appear to be solved. To solve such problems more effectively, it is necessary to take an approach based on social science theory, which handles these solvable types of problems as matters of expertise.

This chapter describes the basic concepts of organizational systems thinking, which embodies social science approaches, and can help us understand the structures that produce various types of problems. In addition, the chapter examines the concepts underlying Theory U, a relatively new approach that focuses on an organization member's need to change how he or she thinks about problems. The Theory U framework will be applied to the JMSDF case described in the next chapter.

A. PROBLEM TYPES THAT REQUIRE CHANGES IN THINKING

Typically, organizations face two types of problems (Figure 1):

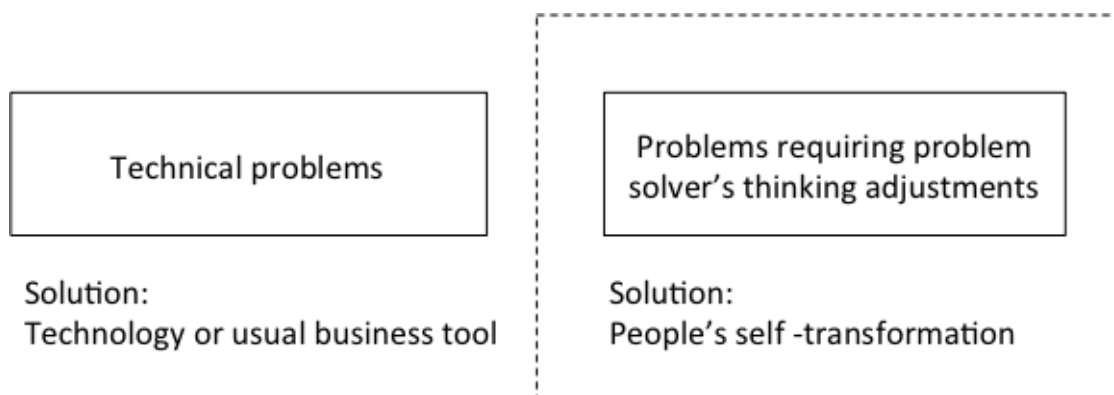


Figure 1. Two Types of Problems

The problem on the left side of Figure 1 can be resolved using technology or conventional business tools. The problem identified on the right side of the figure cannot be solved unless people or organizations change their way of thinking (Heifetz, 2009).

This thesis will focus on the problems shown on the right side. Without change and adjustments, these difficult problems will continue to repeat themselves because the fundamental causes of the problems have not been addressed.

1. Problem Examples in Individuals and Managers

For a familiar example, look at lifestyle-related diseases and depression. When the disease has worsened to the point that outside assistance is necessary, a doctor may take the technical approach of prescribing medication, which, although it may help the patient, cannot possibly solve the fundamental lifestyle problems.

2. MBA Study Example

A problem can become worse when managers provide a solution based on routine ways of solving problems. It may be counter-intuitive at a first glance, but this phenomenon can be observed in both economics and human biology.

The organizational system sometimes may not need “extra help,” as illustrated in a very famous supply chain simulation model called the “Beer Game” (Sterman, 1989). In the beer game, supply chain models are built for the brewery, factory, warehouse, wholesaler, and retail stores based on unit needs to manage inventory. In the assigned unit, the players will conduct selling their beer inventory to smaller units in the supply chain and order in beer from bigger units. The players who try to improve the situation will often create a worse situation, while “do nothing” has about a 75% success rate (Sterman, 1989). For instance, retail stores sell beer to the customer and buy beer from wholesaler. Players in each unit in the supply chain sell beer to lower units and buy beer from upper units. Most players have the backorders in each unit from lower units and lose a sales opportunity during lead time of delivery from upper units, at which point, they make an urgent order to buy more beer with a short and narrow perspective, even though it is unnecessary. After the ordered beer is delivered, they have a larger quantity than the actual demand from their lower units, and they stop ordering suddenly to reduce exceeding stock inventory which creates huge inventory costs. These numbers of urgent orders and exceeding stock become bigger in upper units. These numbers in lower units affect the numbers in upper units. The effect becomes bigger and bigger in the upper

units similar to the movement of a whip. Therefore, this behavior is referred to as the “bull whip” effect. Even though players play the game again with a different role or change the conditions to solve the worsened situation, the situation does not change much unless the players change the definition of each role, or how they think about the problem they are confronting. The good players change their role from a small unit to a whole supply chain, and share the information of each unit. In summation, the system itself—the supply chain—seems to resist the solution. Therefore, while it may be defensive to focus on the perceived problems first as in a small perspective, it is necessary for participants to change their thinking by reengineering or understanding the complete system thoroughly.

3. JMSDF Example

Some of the Japanese Maritime Self-Defense Force aircraft logistics have the chronic problem of being unable to meet operational demand, and so a large number of situations are described as not mission capable from maintenance (NMCM) or not mission capable from supply (NMCS), resulting in emergency requisitions. As the problem intensifies, headquarters staff attempt to handle it by taking technical approaches, such as replacing the budget intended for other aircraft to those that currently have a problem, or to reduce current costs. Although these solutions may be able to meet immediate operational demand, they cannot solve any of the fundamental problems that occur with aircraft logistics. This is due to the fact that under standard managerial methods, the more optimized logistics become, the less flexible these same logistics are in dealing with unforeseen circumstances.

For many organizations, these types of problems, as illustrated in the “beer game” simulation and Japanese aircraft logistics, have become increasingly difficult and require adjustments in problem solvers’ thinking. To solve these problems, it is necessary to understand the core nature of the problem, which requires people to change their problem-solving approach.

B. BACKGROUND ABOUT THESE NEW TYPES OF PROBLEMS

People are facing global problems that they have never experienced before. However, because almost everything in the world can be converted into digital data, many people believe that things like customer demand, results of policies, and future situations in society are already foreseeable (Friedman, 2007). Consequently, decision makers are increasingly relying on data mining and statistical methods to make complex decisions. Compared to a decade ago, it seems to some decision makers that results are more easily predicted because of the vast amount of data that is available.

Recently, new social and organizational problems have emerged that cannot be predicted or solved easily. These problems include energy issues, food crises, environmental destruction, large-scale disasters, terrorism, population decline, job insecurity, mental health problems, and financial crises. These problems cannot be easily predicted, even with current data and the technology to analyze them. Even if methods are developed to solve these problems, the results are often difficult to measure. Possible solutions may face strong resistance. On the other hand, these problems also have ethical implications, adding more challenges to their solutions. Therefore, the usual business tools based on statistical methods may not be robust enough to solve these problems, and new approaches to adjust people's ways of thinking are needed. In the following sections, the characteristics of these problems will be discussed.

C. LITERATURE REVIEW

Systems thinking was introduced by Peter M. Senge as a unique management approach in *The Fifth Discipline: The Art and Practice of the Learning Organization* (Senge, 1990). Senge focuses on solving complex management problems through an understanding of organizational systems and by changing systems—including the mental models of the problem solvers—to insure they are properly aligned. Instead of using conventional techniques such as efficiency improvements and standardization, systems thinking attempts to determine what kind of mental models are creating the systems. Systems thinking also proposes a way to check if the system is sustainable, which differs from the short-term perspectives of efficiency improvement and standardization. For a

traditional organization that focuses on short-term changes, understanding and regenerating dynamic systems is very challenging. To overcome these difficulties, Senge introduces five disciplines: personal mastery, changing mental models, shared vision, team learning, and systems thinking. These disciplines are tools that help managers provide recommendations to their organizations to help them learn about systems thinking and execute modifications in their systems to solve complex problems. Using these five disciplines, people in the organization learn and adjust themselves to tackle the problems.

In the last 25 years, systems thinking has become a very popular concept among business and government organizations. For example, since 1996, the Singaporean Police have adopted the views and methods of a “learning organization.” The ESE (Earth Science Enterprise), one of the divisions of NASA, has also gradually incorporated the views of a “learning organization.” However, practicing the five disciplines in systems thinking is no easy task; mainly because recognizing the various structures in a large and complex system and understanding how they interact with each other is very difficult. Only people who have the ability to derive comprehensive conclusions from small details can recognize the implicit structures in organizational systems.

Senge established the Society for Organizational Learning (SoL) to educate managers in how to view organizations as complex systems, and how to use the systems-thinking tools to solve complex organizational problems. In 2000, systems thinking became more prevalent due to SoL activities. Since then, many individual and joint research papers have been published. Incorporating ideas from cognitive science, Senge and his contributors interviewed over 150 entrepreneurs, scientists, and community leaders (Scharmer, 2011) who became today’s leading thinkers on knowledge and leadership. Senge and his contributors collected the viewpoints from their experiences and knowledge, and compiled them in *Presence: Human Purpose and the Field of the Future* (Senge, Jaworski, Flowers, & Scharmer, 2005). Also contributing to this work was SoL—whose members include 40 universities (e.g., MIT, Harvard, and Yale); 20 industries (e.g., IBM, Ford, Intel); and 60 consulting companies (Takama, 2005).

Presence is a concept introduced in *Theory U* (Scharmer, 2004) and defined as the ability to understand a large and complex system without relying upon current problem-solving mental models. It is called presence because, in a sense, the focus is on the present—the unique set of circumstances that the organization must confront. Theory U encompasses systems-thinking theories (Figure 2) and is the best guide for understanding systems thinking. To assist people in understanding systems thinking and the concept of presence, Theory U describes various mental and organizational elements of the systems-thinking process in a very straightforward way. The systems-thinking process is heavily focused on the decision makers’ frame of reference, commonly called mental models or interpretive schemes, which they rely on when making decisions. Theory U proposes that decision makers’ put on hold their current problem interpretation frame of reference and, instead, focus on the unique circumstances that comprise the current problem. In other words, interior conditions denote the kind of perspectives and positions managers routinely use when attempting to tackle problems.

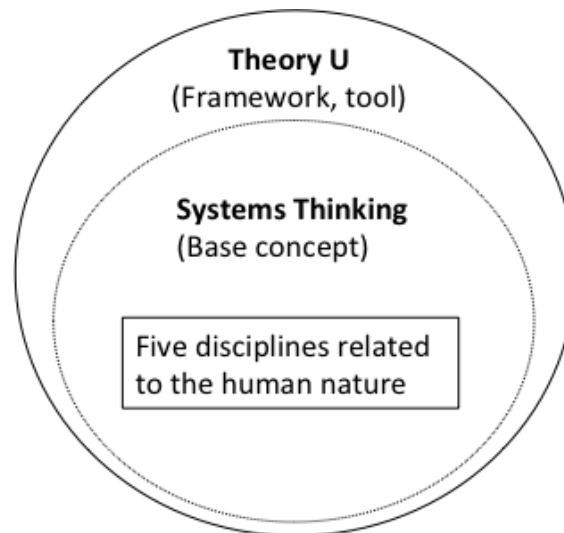


Figure 2. Relationship between Theory U and Systems Thinking.

Moreover, Theory U gives social science guidelines for practicing systems thinking. In the business management community and the social science field, the assessment of mental models in organizational systems is not viewed positively because modern scientific methods cannot easily measure or change these mental models.

However, by using the framework provided by Theory U, people can better understand the impact of mental models on the organization. As a result, people will have common a language to understand systems thinking.

D. INTRODUCTION TO SYSTEMS THINKING

Systems thinking is a way in which people capture the system—giving the cause-and-effect relationships behind problems. Furthermore, systems thinking enables managers to realize that they belong to the system, to get insight into how people understand these system relationships, and how people treat them. Systems thinking can give an accurate understanding of an organization's systems, provide understanding of how to continue to regenerate those systems, and to resolve problems related to those systems.

The process of regenerating a system requires that we put on hold our current frame of reference or mental model and recreate it based on the future we want to create. Because regenerating a system is a very stressful process, people tend to resist the need to change their problem-solving mental model or frame of reference. In fact, many organizations do not have the ability to regenerate themselves, though they have the ability to redesign or reframe the organization's policies and its structural "wiring diagram." Although many managers acknowledge there are deep roots to their problems that may require a different approach toward solving them, they often choose to tackle the problems superficially by using the same problem-solving routines. As a result, similar problems repeatedly occur, because people have a mental model that believes organizations will tackle root problems only when they create a serious crisis.

Currently, it is very hard to practice systems thinking even though it has gained popularity in modern management. In 1997, in the 75th anniversary special edition of the *Harvard Business Review*, Senge's work was featured as one of the two publications that made the most significant impact on the concept of management in the United States during the past decade. However, despite the implementation of training programs in organizations, systems thinking often did not take hold in organizations (Takama, 2002).

This is often due to the companies' methods of implementing the training program.

Companies fail to observe how much the program participants apply what they have learned to their work after the conclusion of the program. Companies also fail to see the critical usage rate that is necessary in order for the practice to take root in the organization. Furthermore, they ignore the amount of time that it takes for the practice to take root. They do not have a method for conducting a return on investment (ROI) analysis to evaluate successful implementation of the training program.

This next section reviews each of Senge's five disciplines that comprise the tools of systems thinking. A review of these tools is necessary to understand Theory U.

1. The Five Disciplines

For an organization to learn and keep progressing, Senge argues for the necessity of personal mastery, changing mental models, shared vision, and team learning, and cites systems thinking as the fifth discipline that includes the other four disciplines (Figure 3). These four elements deal with the way we think, or in other words, the construction of our mental models. Often a company's slogan or mission statement can serve as an example of how their employees should think and behave, hence creating a kind of "organizational mental model."

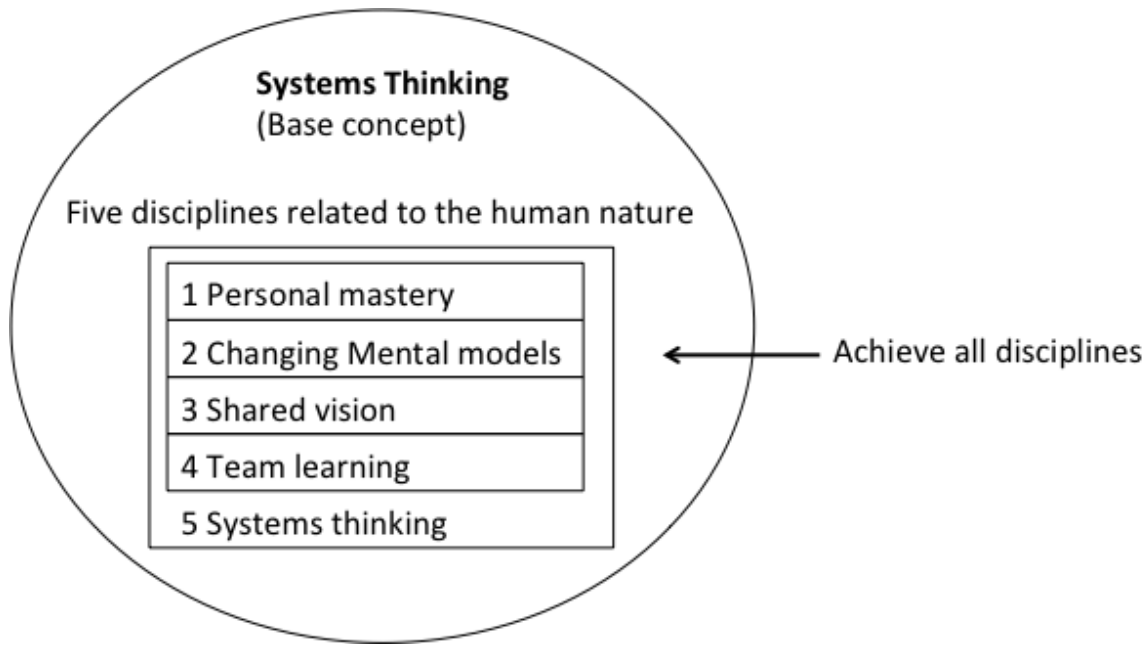


Figure 3. Five Disciplines of Systems Thinking.

a. Personal Mastery

Personal mastery means having a clear sense of self or self identity. This process of personal mastery has the goal of considering oneself to be truly important and developing a passion for the work one is doing. In the workplace, there are personal mastery codes, a self-defense official's compliance (Self-Defense Forces Law, 1961), or definitions that are linked with the organization's identity. Some people may have difficulty maintaining their work motivation once they think that these codes or definitions are too optimistic or too unrealistic for them to achieve. For example, some people may doubt that "JMSDF is an organization with strict discipline, trusted by the people, and lives up to people's expectations" because high-ranking officials are doing just the opposite and getting fired (Council for Ministry of Defense Reform, 2008). Some people do not believe in the investment bank's "client-centered attitude" because the banks generate huge profits while customers are losing money (Smith, 2012). Sometimes people disagree with the codes set by the organization, and as a result, they cannot seriously pursue these goals.

To attain full personal mastery, people should continually ask the following questions: “who am I?” and “what is my purpose in living?” and “how can my personal purpose be connected to the goals of my organization?” When people’s personal mastery goals contain the same direction as the organization’s goals, they share the same passions for the work being done. With personal mastery goals, people try to fix the organization’s misalignment, even though there are fundamental problems in the organization. Due to this part of personal mastery, there exists the courage to challenge the status quo, to create personal visions linked to the organizational vision, to be committed to inquiry, and to seek the real causes of problems. Therefore, it is necessary initially for people to put themselves outside the organization’s personal mastery code and to have their own personal mastery code that reflects their true self identity and purpose.

Theory U focuses on the level of self-awareness of problem solvers and their perspectives and positions. To reach this level of self-awareness, one person must ask the self “who am I?” This self-awareness can develop in workers the necessary discipline to commit to uncovering the root causes of organizational problems, even if that pursuit may run counter to existing organizational problem-solving codes. Once organizational members attain the necessary levels of self-awareness and knowledge provided by systems thinking, they can then use Theory U as a tool to get to the root of organizational problems.

b. Changing Mental Models

Mental models are the basis of people’s attitudes and behaviors. Mental models have a major impact on a person’s decision making; consequently, they must change in a timely and appropriate fashion as problems become more complex. Mental models are not beliefs of which we are consciously aware, but are tacit or subconscious concepts. Therefore, they are difficult to notice, let alone change.

Many Japanese people continue to work overtime, for example, while saying that they hate working overtime. This is because they internalize the idea of overwork. As working overtime is a very common practice in Japan, even people who dislike it gradually become accustomed to being overworked. Another example is in product

development where an innovative idea that generated big sales gradually becomes so commonplace that people take it for granted. The original idea is indirectly agreed to by the product developers. Eventually, that common sense becomes a mental model which drives people's decision making. When the mental model is deeply embedded, people rely on it without even noticing—the model becomes part of their thinking process. As a result, the mental model can control people's perspectives and lead to stereotypes, making it difficult to keep up with new changes in the market and society.

c. Shared Vision

Shared vision refers to the philosophies and goals that are commonly held by workers and the organizations. Most companies espouse an organizational vision and put posters on walls describing that vision as well as include it in company manuals. An organization can gain immense power when its members believe in the organization's vision and act in unity to achieve it, because people engage in the work that they believe in and are passionate about. When people are acting against their will, they are less willing to work hard and well because it is difficult to reach that vision.

The “vision” described here is not based on the power of exceptionally charismatic individuals or on a crisis in the organization. That kind of vision tends to disappear over time, causing people to lose motivation. For example, when there is a new boss or when the company has recovered from some kind of disaster, people may regain their morale, which becomes a kind of temporary illusion. This type of vision often ends up as one individual's own view, rather than becoming something that is jointly shared by the organization. To make one person's individual vision into a shared vision, companies and organizations cannot force their vision onto their employees, but should create the conditions—dialogue, brainstorming meetings, and other forms of communication—in which everyone can freely participate in drafting this vision.

The vision of improving operational efficiency can illustrate this dynamic. When people embrace this vision, efficiency can increase without the organization's extra efforts. Conversely, when the business conditions are in crisis, such an efficiency vision can be forced onto the workers. Punishment or incentives may boost efficiency for a short

period, but after the crisis is over, people are less likely to devote themselves completely to achieving operational efficiency.

d. Team Learning

Team learning is one of several basic forms of learning that occur in organizations. Research indicates that more innovative ideas emerge when people function as a team rather than as individuals.

However, true team learning can be difficult to achieve. Far too often team members “beat each other up,” shame each other, and abuse each other at the expense of dialogue and other productive forms of interaction. Furthermore, the results of team thinking are often underappreciated by people in organizations. If people can pay attention to each individual during team meetings, they can easily determine whether team learning is successful. Some examples of people failing to practice team learning during meetings include: giving empty talks without offering constructive solutions; using flattery to achieve individual goals rather than team goals; criticizing the organization aimlessly, which saps motivation; and using power to silence minority voices. When these meeting dynamics exist, people may treat meetings as mere formalities and never participate mindfully, which results in minimal team learning.

To make team learning successful, one must understand the importance of open interactions of team members. This interaction is strongly influenced by hierarchy, particularly in military organizations, and the roles of the departments each member belongs to, even though people often say that there is completely open communication in their team. Therefore, it is necessary to reduce these influences so that people truly feel comfortable interacting. For example, the team can make rules that guarantee the confidentiality of opinions or eliminate any possible impact that dissenting or unpopular opinions can have on a member’s career progress in the organization. If teams create a communication climate where members can exchange ideas openly, they may also be able to challenge their current way of approaching problems and begin to consider broader, more systemic ways of thinking about and formulating problem solutions. Such a process is the key to successful team learning.

e. Systems Thinking

Systems thinking is the fifth discipline that integrates and coordinates all previous four disciplines and provides the framework to put them into practices (Figure 3). Through the application of systems thinking, the capacity of each discipline affects each of the others and is strengthened, thus enabling these disciplines to be more thoroughly coordinated. More details of this coordination will be explained in the next section.

f. The Characteristics of Systems

There are many important elements in systems thinking. One is that the cause-and-effect relationships in systems are always circular, not linear. The observer of the problem is considered part of the system as well. Another element is that systems themselves have their own particular characteristics: “lateness of effect, self-reinforcement, the neglect of root causes, and escalation” (Senge, 2014). Finally, the conventional methods of business management do not function well in relation to systems thinking.

g. Systems Are Circular

The cause-and-effect relationships that are in systems are always circular, not linear. The self that is observing the problem in a system is one element that makes up that system, and is one of the causes that produces the problem.

First, an example from a very simple linear system is examined. Country A is the observer’s country, and Country B is the other country. The observer lives in country A. Figure 4 shows the observer’s reaction to Country B’s action: building up military forces. With the perspective of “me,” the observer sees this action simply from the individual’s point of view. The observer’s attention is caged in his own individual experiences, not in Country B’s action. Therefore, the observer feels no need for involvement in Country B’s action, saying “So what? It’s none of my business” or “I have seen this before.”

Perspective of “me”: “So what?”

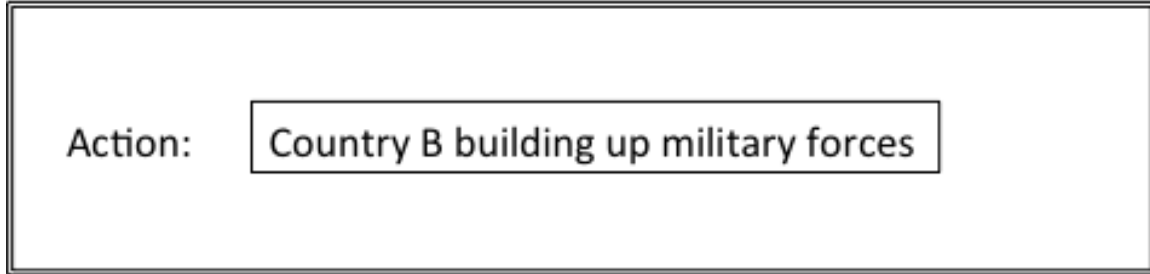


Figure 4. The Reaction to Country B from the Perspective of “Me.”

Figure 5 shows a different reaction from the observer to Country B’s action. Although there is still the same perspective of “me,” the observer sees this action outside his personal judgment. The observer’s attention is in “it,” namely, Country B’s action. Therefore, some feelings of unease emerge toward Country B’s action. The observer may now say, “This military buildup may be a problem.”

Perspective of “me” without individual judgment : “Perception of a potential problem.”

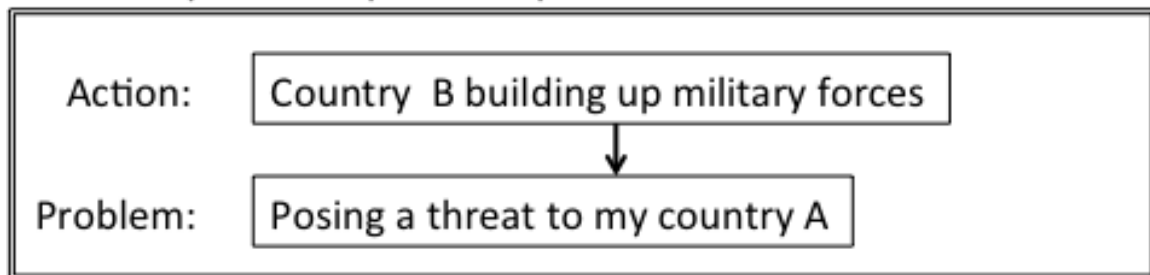


Figure 5. The Reaction to Country B from the Perspective of “Me” without Personal Judgment.

Figure 6 shows a linear system in which the military forces buildup in hypothetical enemy Country B creates a counter military power buildup in home Country A. This linear system represents a developmental process of the problem. The cause: military forces buildup in hypothetical enemy Country B. Such cause brings a problem: posing a threat to the home Country A. To counter, Country A also begins to build up its military power.

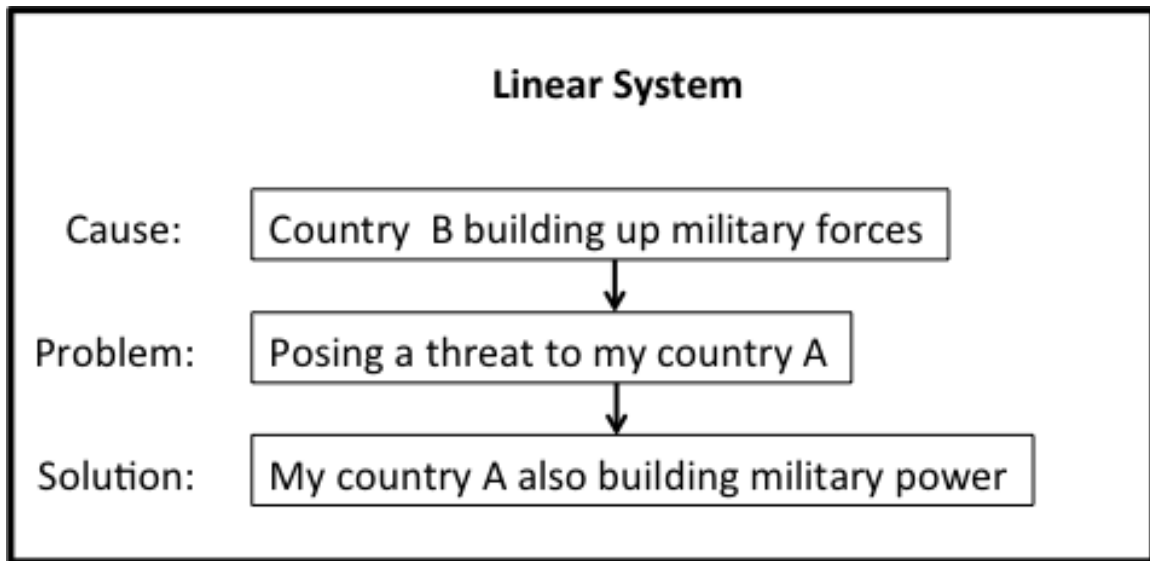


Figure 6. Linear System.

Next, we'll look at this problem from the perspective of the Country B. Figure 7 shows Country B's system within Country A's thinking process. With the perspective of "you," the observer is able to see the action from the other's perspective. The observer at this stage is able to see events from the other's perspective without cynicism, even if they are adversaries (Scharmer, 2012). The observer's attention here is "you"—the same as Country B's perspective. Therefore, the observer may say, "I understood your situation and what you are doing."

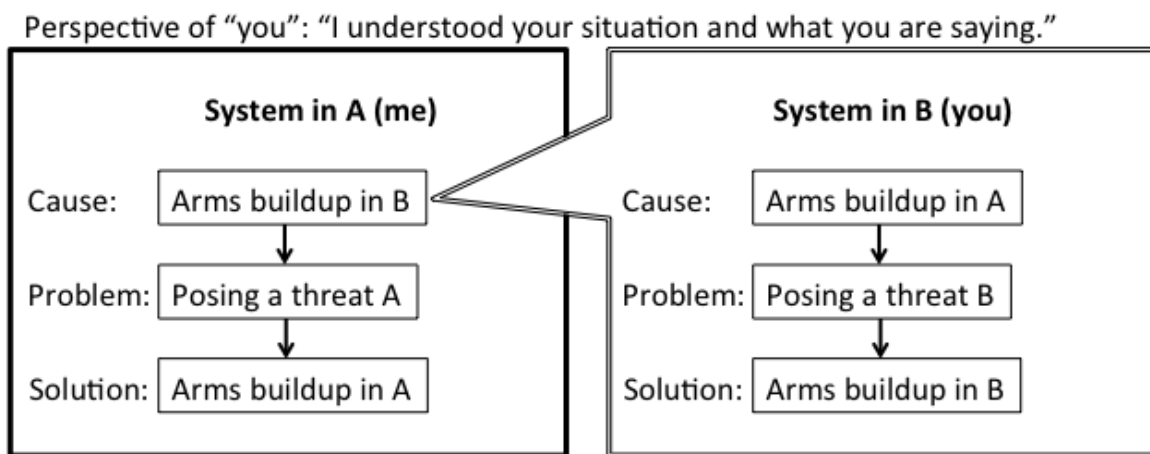


Figure 7. Country B's System with the "B" Perspective.

In system A, the buildup of armaments in another Country B gives rise to the buildup of armaments in observer's own Country A. Similarly, a nearly identical linear system exists in the system B side as well.

Next, we will look at this problem from the perspective of the entire system, including all stakeholders. One country's actions become the causes of the problem for the other country. As a result, all systems are connected to each other (Figure 8). Therefore, these two linear systems comprise one cycle.

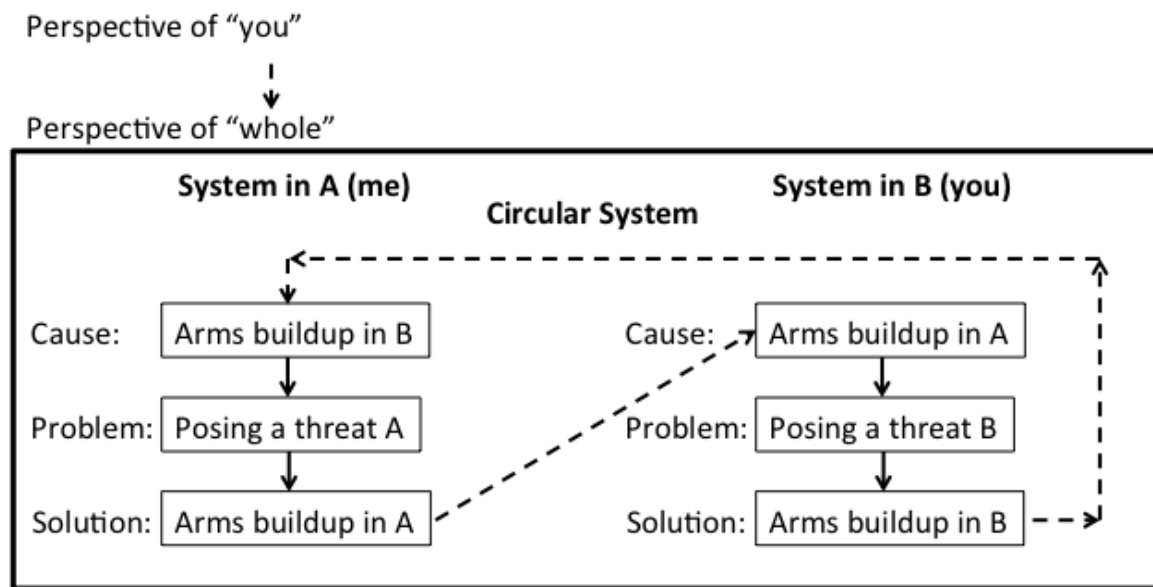


Figure 8. Two Linear Systems Create One Circular System.

This circular system is shown in Figure 9 in a simplified manner. All actions are the causes and the effects at the same time.

Perspective of “whole” Every action can be cause and Effect

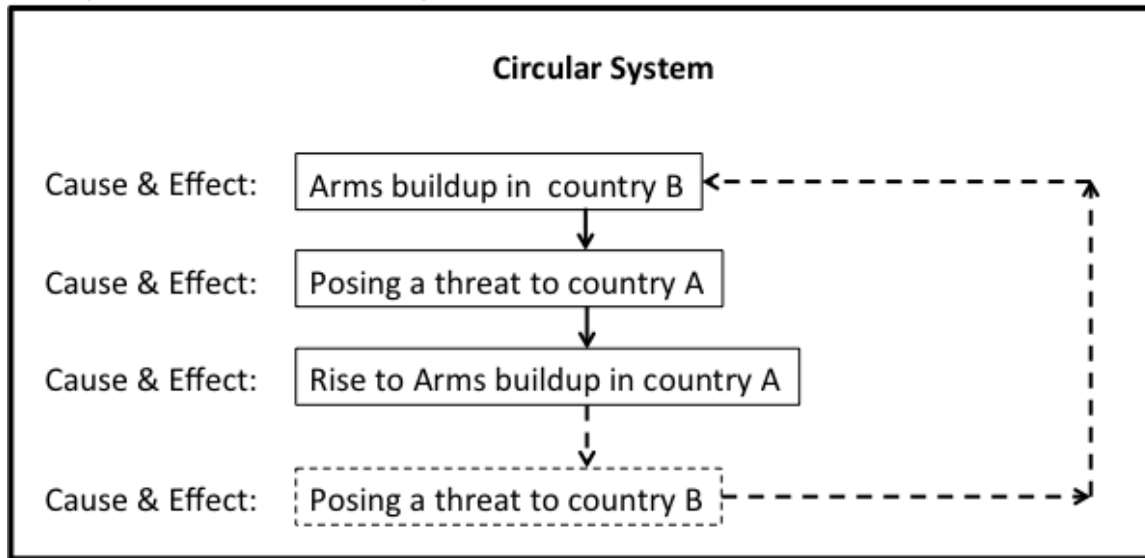


Figure 9. Circular System from the Perspective of the “Whole.”

Figure 9 shows a circular system that includes A’s and B’s linear systems. From the perspective of the “whole,” the observer sees the entire system and is able to acknowledge the concerns of both stakeholders. At this stage, it is possible for both Country A and B to feel apprehensive because each country’s action represents potential threats. It is also necessary for both Country A and B to see that their actions create effects that they do not want to have or have not anticipated even though their initial actions seemed like a good solution when they looked at the problem without a whole system perspective. Therefore, facing the problem, the person with the perspective of “whole” may say that “every action can be the cause and effect, and we are suffering as a result of a potentially bad decision from our own solution.”

If the same model included two or more systems, these systems would seek a relative advantage of forces, like the situation in the Cold War, and a never-ending competition would ensue, even though no one would want to have the Cold War situation. This shows that a circular system can escalate common problems between stakeholders if they lack a whole systems perspective (Figure 10).

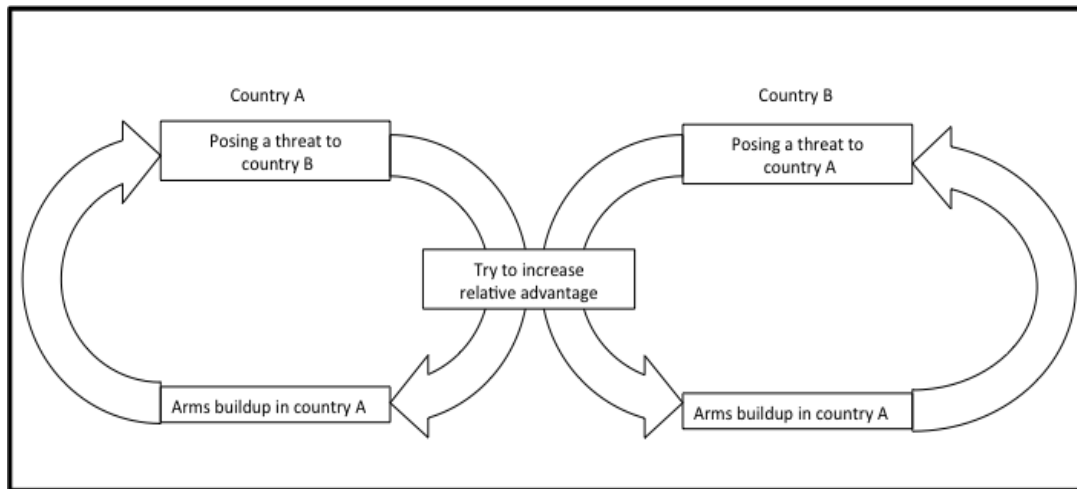


Figure 10. Escalation Dynamic in System.

h. System has Lateness of Effect, Self-reinforcement, the Neglect of Root Causes, and Escalation

In this circular system, each counter measure produces an undesirable situation for both parties. In the linear system, increasing military power buildup in response to the same action of the other country appears to be the reasonable reaction. However, when viewed in a circular system, the counter measures generate an ever increasing military threat between countries and create strong tensions that could lead to a destructive end.

Regarding the complicated problems mentioned previously, the lack of awareness of this circular system can make the problem worse. If people face similar problems repeatedly and cannot solve the root causes of these problems, the unperceived circular system is likely to occur. It would be useful to substitute actual individuals or countries into the A and B scenario in the previously mentioned example. For instance, the nuclear arms race between the United States and the Soviet Union during the Cold War has led to nuclear proliferation whose possible outcomes have yet to be determined.

In summary, many complicated problems today can be seen as these circular systems. The observer is part of this structure that creates problems. When people are able to redefine their point of view and notice this circular system, it may be possible to find a fundamentally new approach to solve the problem.

2. Precautions for Implementing Systems Thinking

When applying the systems thinking in a real-life setting, Senge provides some preliminary recommendations: the participants should understand the ineffectiveness of standard business management, the absence of a “perfect tool,” and the complexity of the issue. It is also important to understand that people can be easily trapped in the past, which the current education system unfortunately promotes.

a. Standard Business Management Tools Are Ineffective

The standard business management tools are ineffective in response to large scale problems created by complex systems. The reason for this is that such tools make analyses from a short-term viewpoint and are based on past data. These tools do not provide insight on the current system dynamics and the individual and organizational mental models that created the circular system.

For example, if people follow the general procedure of problem analysis used in business management, past facts are turned into data, and predictions about the future are made using statistics and multivariable calculations. Specific conditions are applied and an optimum solution is obtained. This kind of procedure that investigates only a snapshot of an extremely brief system fragment cannot provide meaningful results because the circular system from a long-term perspective is not being considered.

When the desired result is not achieved with standard business tools, people may ask why the results are not those for which they had hoped. They may believe that the situation has changed. However, the truth is that the situation is always changing but because of short-term, non-systems focused thinking, no problem-solving adjustments have taken place.

In the example of the JMSDF aircraft supply model, it is possible to make a proposal that cuts inventory expenses by not retaining unnecessary inventory based on the analysis of past supply requisition data. However, this proposal will reduce the budgets in the long term and the lead time necessary for unanticipated supply requisitions will become even longer. This outcome does not improve the decreasing aircraft mission capability.

The same kind of situation can also be viewed by quality management from a mid-term point of view. By analyzing the past malfunction data and attempting to increase the quality of parts with high malfunction rates, it is possible to prevent decreasing aircraft availability rate. However, by focusing only on the malfunction trends in parts, the fundamental reason as to why the malfunction has occurred still goes unrecognized.

b. A Perfect Tool Does Not Exist

Thanks to modern technology, rather complex models can be represented on computers, enabling future predictions to be made. However, despite the latest specialists, it is still impossible to model accurately all the variables and their interactions that make up complex logistic systems like life cycle cost (LCC) models. For example, JMSDF has good supply and quality control systems similar to aircraft systems of the United States Navy or Marines. Even so, certain kinds of aircraft will always be grounded due to lack of replacement parts. The construction of a perfect supply system model is somewhat similar to the construction of a perfect computer anti-virus system—it is a problem that will never be solved without changing the current system.

As mentioned earlier, people are unable to create a new future in which problems are solved using systems thinking when they rely only on standard business management tools analyzing past data. Many people acknowledge that systems thinking is an important approach toward solving complex problems; however, they have significant difficulty abandoning past problem-solving ways of thinking and making the significant effort required to master system-thinking tools—what Senge calls the five disciplines.

c. It Is Necessary To Be Able To Comprehend Complexity

The ability to comprehend a different kind of complexity is a necessary step to solve the problem of people's lack of awareness of the circular system. The complexity that people generally understand and act on is called "variety complexity," which is different from "dynamic complexity," which requires systems thinking.

Variety complexity refers to various past data, statistical distributions, and variable calculations. To solve variety complexity problems, the standard method is to make a model based on past data, then to forecast possible outcomes with the model, and to choose the most feasible solution to the problem that has been modeled. Even with complex situations, decisions can be made with confidence because predictions created by the data based on the model are able to project the best- and worst-case decision outcomes.

With this linear problem-solving approach, however, people may easily overlook the circular system, because this linear approach is essentially a reductionism that ignores much information related to human nature. For example, this approach cannot reveal people's mental models based on their past experiences. To accurately capture problem complexity, it is necessary to generate models that capture the perspectives of all the stakeholders.

Dynamic complexity, put simply, is a complexity about which people cannot make predictions from past data because the data is too complex and it is constantly changing or evolving. According to Senge, it is a complexity where an interaction between cause-and-effect does not reveal clear results over the long term. Dynamic complexity also gives results different from the predictions. As many current world issues today deal with dynamic complexity whose solutions cannot be predicted by past data, standard, systematic modeling methods and other business management tools that use past data to recommend problem solutions would not be effective.

Rather than attempting something as difficult as creating a model of how people actually think when confronted with a complex problem, it would be easier to determine what kind of future people actually desire. What is essential is to rely far less on analyzing past data, but to create organizational processes to create the desired future state and the necessary actions to achieve that future state.

d. The Nature of Human Influence on Systems Thinking

In working on problems, system thinking places emphasis on human nature and aims for problems to be solved on one's own, by taking the initiative to learn and change

one's self in order to adapt to the environment. People's thinking processes are created by the environment in which one is raised, the education one receives, as well as the workings of the brain. For these reasons, it is essential to doubt these three factors: environment, education, and the brain. Without doubting these factors, it is difficult to make quality decisions under conditions of extreme uncertainty due to a lack of questioning entrenched problem-solving processes. If one does not question the way one handles problems, it is hard to break free from the way of thinking that caused the problem. With a questioning of these factors, these problem-solving processes can be seen objectively, allowing room for them to be questioned. By questioning the way that one handles problems, the choice to suspend one's existing way of thinking becomes possible, making it easier to accept a new way of thinking to solve the problem.

3. Action Learning

The following sections explore action learning, which is not only a problem-solving method but a way to increase employees' capacity to learn through thoughtful questioning, listening, developing action items, and reflection. Action learning involves individual as well as group examination and contribution.

a. Changing Not Just the Method, But Changing Yourself

If people choose to look narrowly at the concept of a system, Senge's idea is not particularly original—it calls for systems thinking to solve problems in much the same manner as during the early 1970s. However, his groundbreaking approaches include: discontinue analyzing past data, find circular systems behind the problem using every stakeholder's perspective, and determine the desired future state once the problem is solved, and identify the actions required to achieve that future state. This means not only changing our methodology from the standard business management tools to systems thinking, but also changing the way that workers think about, approach, and solve problems, because people rely too heavily on standard tools. When people depend on their existing tools, people approach a problem without changing their way of thinking. To improve this situation, business leaders need to realize that our business and executive

development education systems focus almost exclusively on using existing tools rather than on methods and processes helpful in changing one's way of thinking to approach problems from a systems perspective.

b. Putting Systems Thinking into Practice

A simple example of systems thinking in actual practice is as follows: Company A has made a particular decision. This decision turns out to have fatal consequences where customers were injured or died from the decision, the company is being sued by a customer, and it faces possible bankruptcy or getting non-operational availability of vehicles for the militaries' mission. Consequently, the decision must be reconsidered. The company needs to bring all stakeholders together to hold a dialogue or a meeting that allows people to talk without pressure. The company looks at all elements, particularly the company thinking involved in creating the current system through dialogue without any judgment. For example, when only the CEO and executive officers discuss recall, issues of profits and losses or of accountability can get entangled, and it is sometimes difficult to reach an impartial conclusion quickly. When an environment is created in which it is not necessary to think about one's term of office or issues of accountability—a reassuring environment, such as that created through dialogue—then all the stakeholders can come together and discuss system issues as a team, enabling decisions to be reached from a long-term and impartial company point of view, unrelated to the interests of any one individual (Shibaura, 2008).

Dialogues where people can speak without pressure and judgment are necessary to uncover the current organizational and individual mental models. For instance, managers would need to look at fundamental ways of thinking, such as “maximizing shareholders' equity,” which may have been the major motivators in its decision making. Without making value judgments about whether maximizing shareholder equity is the right approach, this manner of thinking—the company mental model—is made clear. If left unclear the remaining topic could be influenced by this way of thinking without people being aware of how this tacit organizational assumption is influencing the dialogue. For example, by listening to employees' reasons for concealing the need for

vehicle recalls (Wilfried, 2004), their true feelings show up. Although the employees were expected to act as autonomous individuals, they were limited in their roles as “employees” and held a mental model that allowed them no choice but to act in accordance with the desires of the company (Nakamura, 2012).

After the dialogue makes clear the mental models that are the basis for the company’s interpretation of data and decision making, all participants have a deeper understanding of the current system assumptions. Once they recognize the mental model, they understand that the mental model is the root problem creating problems similar to those caused by the circular system. Employees have a tendency to take actions that meet a company’s goals maximizing profits—more seriously than the safety of customers—until this mental model is revealed. After they reveal the mental model, they can see the circular system as the following: Because immediate profits end up being considered so important due to the current mental model, safety measures come to be compromised from the planning stage, and an environment in which recall easily occurs becomes difficult to create. Making matters worse, there are predispositions due to the current mental model that try to hide the need for a recall because it is easier to take action only on the surface-level causes of recall rather than solve the root problem. These situations degenerate into a vicious cycle of negativity, without any improvement.

After recognizing this negative circular system, people regenerate the system based on the future that they wish to create, and they create new, corresponding values and put them into practice. With the matter of a recall, efforts are made to raise the status of employees’ autonomy and come to protect their status, and to assure them their viewpoints and the safety of customers are considered.

The following four disciplines can be seen to be important here: employees taking other things more seriously than the desires of the company (personal mastery); coming to recognize the existence of mental models through the process of dialogue and working on changing current mental models; expressing that which everyone desires (shared vision); and discussing mental models and shared vision among all the stakeholders (team learning).

c. The Achievements of Senge and His Collaborators

What is impressive about Senge and his collaborators is that they carry out systems thinking practice in real life with great success through action learning from which they can verify the accuracy of these theories based on actual organizational outcomes. For example, at one of NASA's divisions, the Earth Science Enterprise (ESE), they employed systems thinking in order to prevent a defensive, blame-oriented mental model from arising during times of change (Kawaguchi, 2005).

The ESE experienced problems in the relations between headquarters and the various departments. For example, while they were in the midst of carrying out their missions, the program managers of each department became unable to manage the program within their budget. In this situation, the managers did not hold themselves accountable; instead they only demanded "more funding and personnel" from headquarters. Eventually the departments and headquarters became unable to trust each other.

Then, ESE held a systems thinking workshop and explored ideas of how an organization should be run. At the workshop, each individual clarified his or her own mental model through dialogue. By considering their own mental model as a maker of ineffective cause and effect relationships, they connected each component into its place within a circular system. In this process, the participants realized that their actions were conceived within a structure at a level deeper than the level where their actions were taking place.

By understanding that their actions were undermined by defensive motives arising from their fear of being "judged," the participants became liberated from their fear. As a result, they stopped making defensive arguments and remarks to blame and criticize other people. They started having constructive discussions with each other, asking the question: "How can we change the system we have now?"

Listed below are several examples of large organizations employing systems thinking to solve problems exhibiting dynamic complexity with the help of coaching contracts with SoL (Senge, 1997).

- Hastily Formed Network (HFN) project with SoL's sponsors—Boeing, Department of Defense, DTE, Ford, and Tufts University. HFN was coined by the Department of Defense and the Naval Postgraduate School, and describes the multi-organizational groups that come together to create coordinated action in crises without a centralized system such as the tsunamis in Indonesia and Hurricane Katrina in New Orleans (Denning, 2006).
- Coaching programs for about 200 government agency executive officers from 2003 to 2006. SoL supports the agency's leaders to transform their organization from an authoritarian bureaucracy structure, effective for a single major target, to a more flattened and flexible, open, collaborative organization.
- Executives' leadership program for Nissan to deal with change and uncertainty, and understanding that organizational transformation is the result of personal transformation.
- Developing the internal knowledge-sharing conference for Shell, one of the world's largest oil and gas producers in 2004. SoL helped to prepare their conference with Emergent Learning Maps (EL maps). EL maps are an effective tool for session planning, framing questions, presenting the theory, giving the good data, leading conclusions, and making proposals.

The importance of systems thinking and its benefits are already evident through the results companies have achieved from implementing Senge's work. However, this implementation of systems thinking has not gone far enough to produce the momentum that will change the problem-solving approaches that people and organizations use to tackle complex problems.

E. INTRODUCTION TO THEORY U

To facilitate systems thinking, which deserves more attention, Theory U was introduced by Otto Scharmer (Scharmer, 2004). This Theory U explains how to solve problems through regenerating organizational systems by providing a conceptual framework from the social sciences. This framework is very innovative because it takes into account decision makers' interior condition, which they rely on when making decisions, instead of resorting entirely on past experiences.

In this framework, interior condition is explained as the people's perspective and attention to the relationship between the observer and others. Originally, Senge explains Theory U by focusing on attention only, but this paper will explain the theory based on

perspective as well for easier understanding. Here, perspective represents the judgment standard created by past experiences, and attention represents the focus on something. In other words, it is the framework that emphasizes whose judgment standard it is, and on whom it is focused, when approaching a problem. To use the sense of ‘seeing’ to illustrate, perspective is the lens; attention is focusing.

It is necessary for organizations to continue to regenerate systems related to complex and chronic problems that require adjustments to their modes of thinking when they try to solve these problems. The difference between regenerate and other words like react, redesign, reframe is whether the problem-solving process can destroy the vicious circular system and create a system without the mental model that caused problems. Theory U insists that it is important to reach a wider perspective and more focused attention at each stage in the process of continuous regenerating systems. With the framework of perspective and attention, it is easy to understand and conduct desirable regeneration. This understanding of ongoing system regeneration creates new possibilities for managing business environments characterized by dynamic complexity. However, continuous regeneration can cause great anxiety. Theory U, though, is an effective tool for understanding this anxiety and overcoming it.

1. Blind Spot, Inner Place

Usually leaders’ and managers’ skills concentrate on short-term results and the methods of “how to” achieve those results. However, Theory U focuses on managers’ interior conditions—their individual and organizational mental models—that influence the outcomes they strive to achieve. The interior condition is where attention and consciousness, or awareness, reside. Scharmer (2004) calls this interior condition the “inner place” or “blind spot,” which dominates a person’s every single decision. He insists that when it comes to leadership, people are often blind to this inner place (Figure 11).

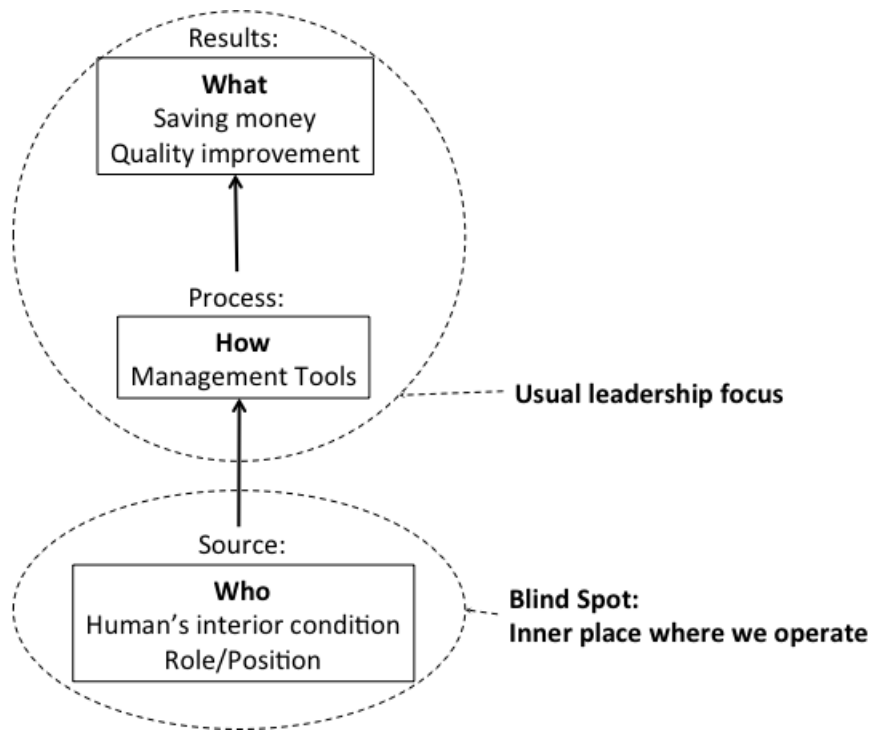


Figure 11. Blind Spot of Leadership (After *Theory U*, 2009).

The top of the figure shows goals such as cost savings and quality improvements that influence decision results. To achieve these goals managers rely upon a variety of management tools. Finally, the source of the goals and the belief that specific management tools can overcome problems that stand in the way of reaching those goals comes from the organization's identity and the interior condition of its managers. This interior condition, which is often neglected in conventional management thinking and practice, Scharmer calls the "blind spot" (Scharmer, 2004).

Theory U describes the process of problem solving using the inner place concept that explains a manager's perspective and his or her focus of attention. In broader terms, the inner place focuses on the relationship between the observer and others when they tackle a complex problem. In other words, Theory U is looking at the nature of humans through a person's perspective and attention. In contrast, systems thinking looks at the nature of human problems through the lens of the five disciplines that are not easy for everyone to master.

Scharmer contends that managers can solve complex problems that require adjustments to their modes of thinking when they reach this wider inner place. The steps for each level of this inner place will be stated in the next section. By understanding this wide inner place, managers are better able to recognize the mental models as well as the sources of those models that have a major impact on their decision making.

2. Four Attention Levels in the Inner Place

The inner place is divided into three perspective levels and four attention levels of increasing breadth (it can also be called depth) (see Figure 12), which Scharmer calls the field structure of attention. It is easier to understand the theory's concepts if one thinks of perspective as the lens, attention as the focus, attention's place as the focal position, one's boundary as the lens' edge, and background as information.

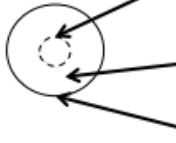
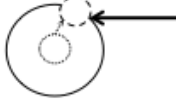
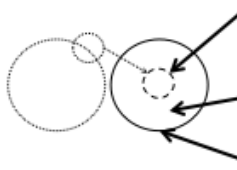
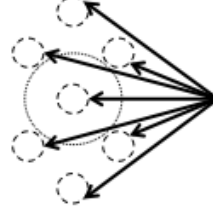
Attention	Perspective	Attention's place (focus place)
Shallow I in "me"	↑ narrow "me"	 <p>Attention in one's perspective (focus in one's lens)</p> <p>One's perspective from past experiences (lens with one's color)</p> <p>One's boundary (boundary of lens)</p>
I in "it"		 <p>Attention on one's boundary without one's perspective from past experiences (focus without one's lens color)</p>
I in "you"	"you"	 <p>Attention in the other's perspective (focus in other's lens)</p> <p>Other's Perspective from past experiences (lens with other's color)</p> <p>Other's boundary (boundary of lens)</p>
I in "whole" Deep	↓ wide "whole"	 <p>Attention as a whole without any perspective from past experiences and any boundaries</p>

Figure 12. Field Structure of Attention (After on *Theory U*, 2009).

Information that exists before a person's judgment is added is originally non-biased. When people consider information, they see it through past experiences; thus, it appears as if the information is biased from the beginning. When people pay attention and judge the information—because they try to explain it logically—it is divided into fine categories that did not originally exist. The focused-on and finely-categorized information is expressed as information with separations. As the attention and perspective level deepen, the information returns to original status without any bias and separation.

In the first attention level, I in "me," people look at problems only from their own perspective, and their attention remains within this narrow perspective. People also react—make judgments, choose data to assess, and interpret that data—inside their

perspective or boundary. In the previous example of military force buildup, people's attention place is in Country A's perspective as seen in Figure 13.

Attention I in "me"
Perspective of "me"
"So what?"

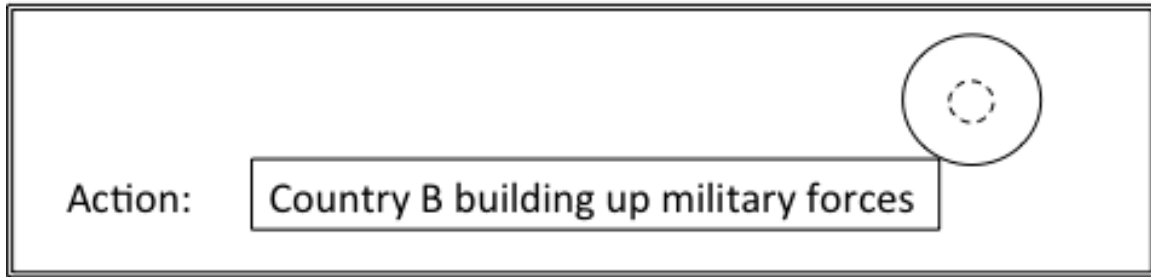


Figure 13. Attention I in "Me."

In the second attention level, I in "it," people look at problems from their own perspective, but outside their own personal and individual judgment. Their attention is in "it," or the nature of the problem, and far less in "me," or their personal beliefs about the problem. People's focus of attention moves to their boundary of the perspective (boundary of lens) and resides in Country B's action as seen in Figure 14.

Attention I in “it”

Perspective of “me” without individual judgment

“Perception of a potential problem.”

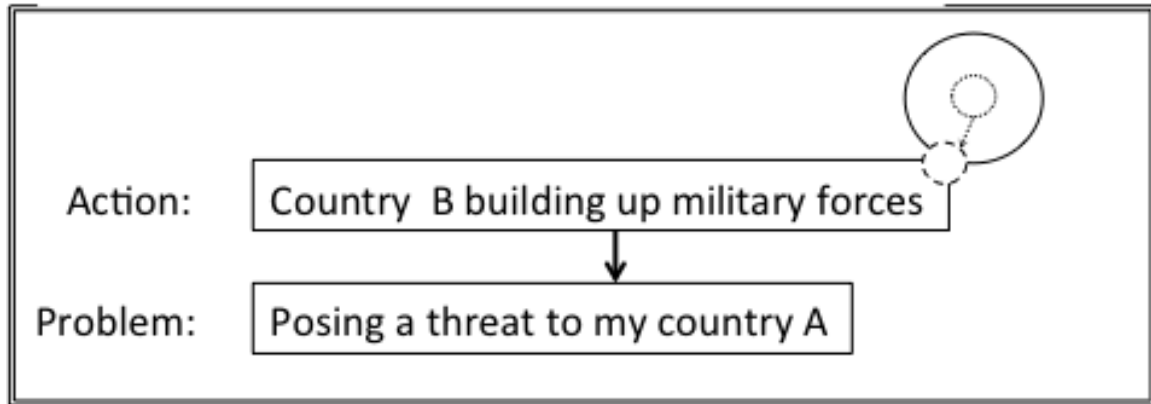


Figure 14. Attention “I” in “It.”

In the third stage, I in “you,” managers regard themselves as similar to others and look at problems empathetically. Their attention is in “you” or within others’ perspective. People also react beyond their boundary created by their personal and organizational mental models. People’s attention place moves to Country B’s perspective and is beyond Country A’s boundary, as seen in Figure 15.

Attention I in “you”
 Perspective of “you”
 ” I understood your situation and what you are saying.”

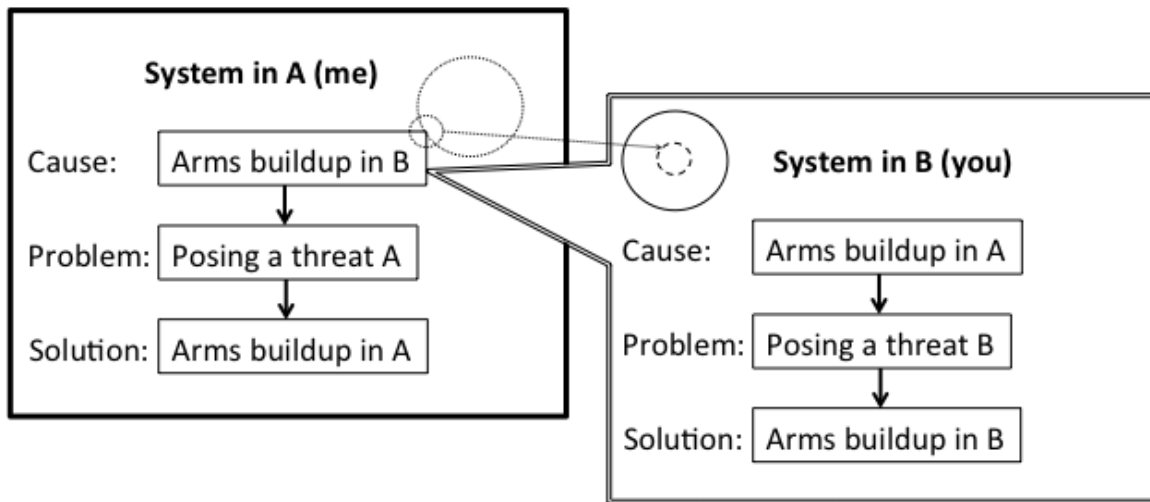


Figure 15. Attention I in “You.”

In the fourth attention level, I in “whole,” people see themselves as part of the whole system and look at problems in a generative or growth inducing way rather than merely as a way of solving a short-term organizational deficiency. The managers’ attention is in the “whole” system with an open, broad-based perspective. People also react to information across their own organizational boundary. People’s focus of attention shifts to account for every stakeholder’s perspective as seen in Figure 16.

Attention I in “whole”(“now”)
 Perspective of “whole” Every action can be cause and Effect
 “We don’t need to stick this circular system.”
 “We can regenerate the new system as future emerges”.

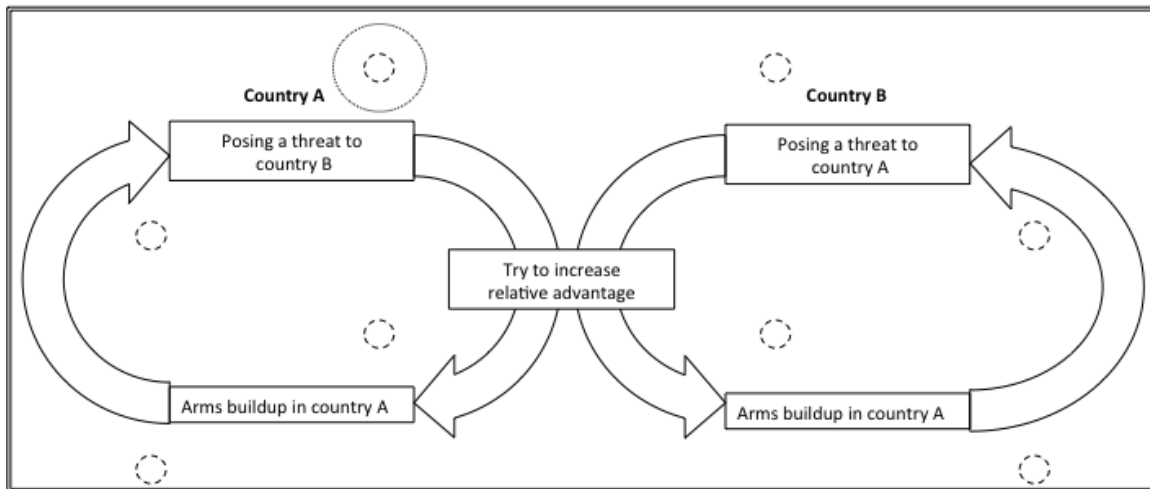


Figure 16. Attention I in “Whole” (“Now”).

Scharmer calls the widest or deepest attention level, I in “now” or “whole,” as presence. Presence is the ability to focus exclusively on the current set of organizational circumstances without a decision-making bias, and to avoid reliance on past experiences that created the problems. This ability is called presence because the decision makers’ focus is on the present set of issues that created the problem. At this widest or deepest level, managers may be able to see the entire system more clearly and envision ways to change the system to solve complex problems that could not be seen at the other levels in the field structure of attention.

3. U-shaped Movement of Attention

When people attuned to systems thinking tackle a problem, their attention goes from attention level “me” down to the deeper “I in now” level to observe the system behind the problem. Once they understand and sense the system, their attention climbs levels to the top again to develop feasible ideas as solutions. This movement through the levels of attention when people solve a problem matches the shape of the letter “U” (see Figure 17). This is why this theory is called Theory “U.”

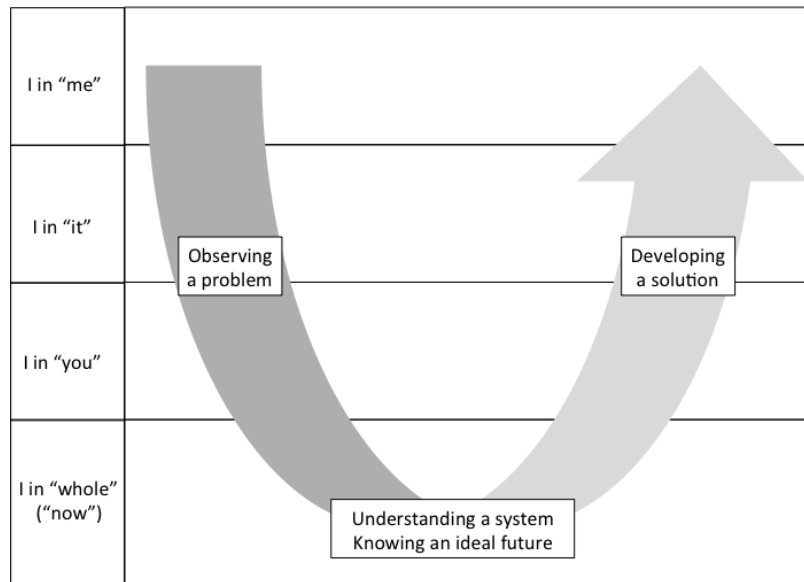


Figure 17. Movement through Attention Levels in Problem Solving (After *Theory U*, 2009).

a. Movement of Attention Relative to Complexity of the Problem

For relatively simple or technical problems that do not require adjustments in problem solvers' method of thinking, they can find the system behind the problem in the attention level "me" or "it." In this situation, the curve of the U movement is shallow. For the complicated problems exhibiting dynamic complexity that require the managers' to adjust their mode of thinking, managers need to go down to a deeper attention level. In this case, the curve of U movement is deep (see Figure 18).

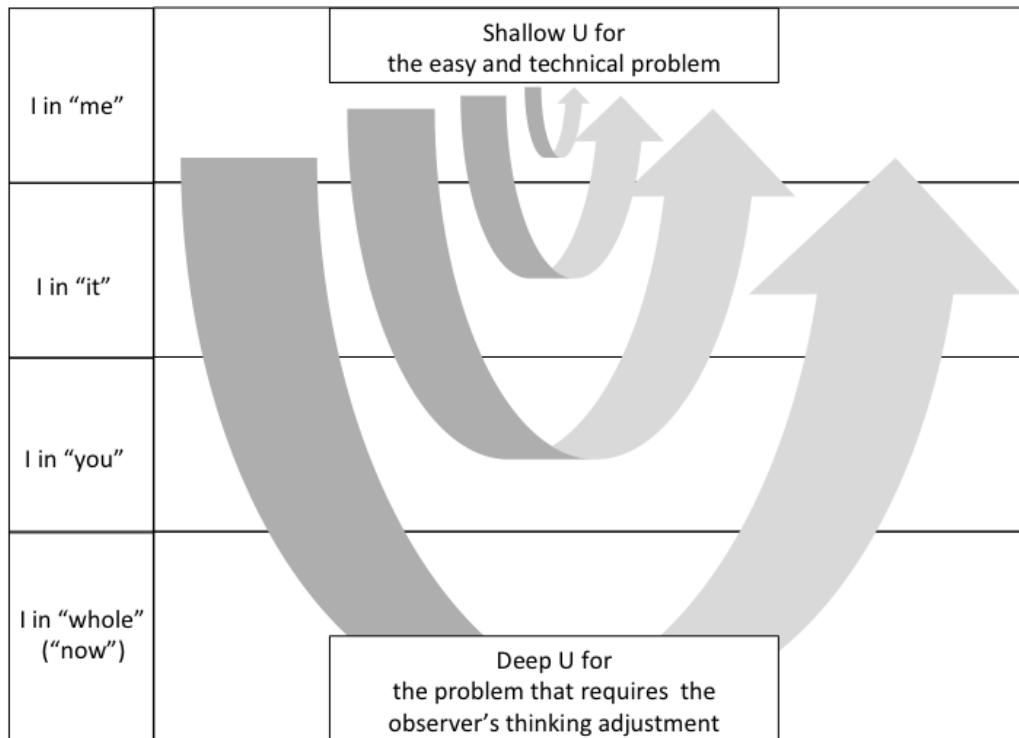


Figure 18. Depth of Attention Movement (After *Theory U*, 2009).

b. Four Levels Responding To Solve Problems

The four levels of responses to different problem types can be seen in Figure 19. Attention level “me” is reacting and responding by relying on existing habits and routines. Attention level “it” is redesigning, changing the underlying structure and process while still operating within the constraints created by the organization. Attention level “you” is reframing, changing the underlying pattern of thinking. Lastly, attention level “whole” is regenerating, connecting with “the presence,” and trying to see possible organizational futures without the mental model that created the problem. In levels of “me” and “it,” people try to solve a problem only with technical tools. In levels of “you” and “whole,” people try to solve a problem by adjusting their way of thinking.

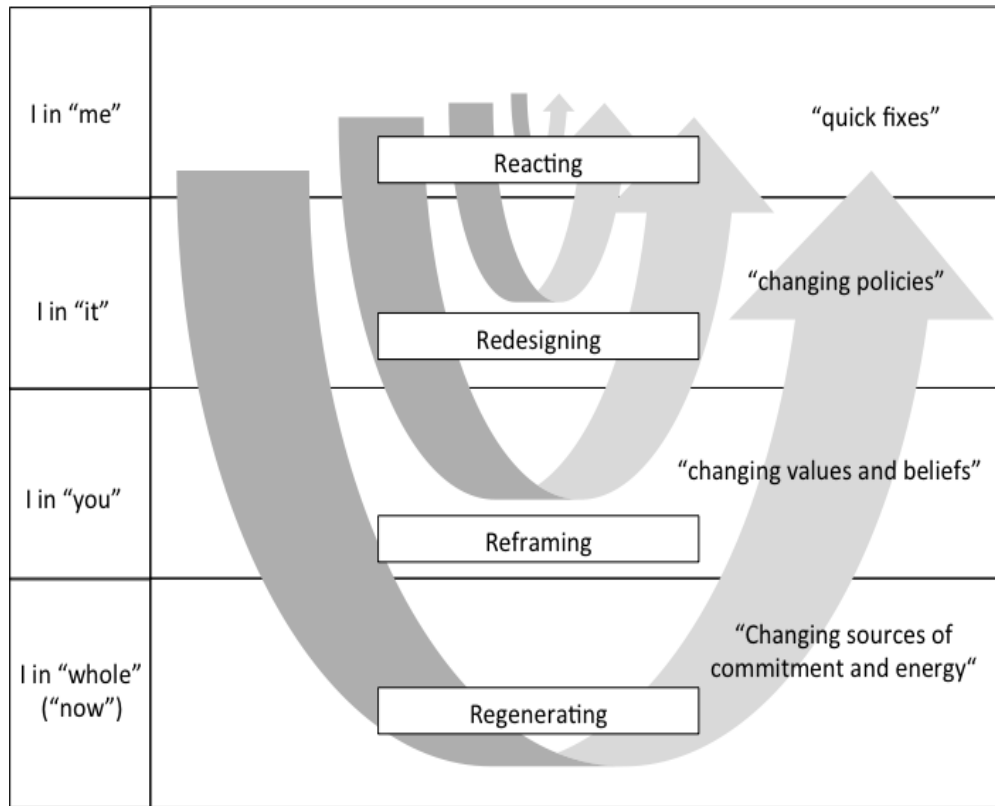


Figure 19. Four Levels Responding to Change (After *Theory U*, 2009).

Most time and resources in our current organizations and institutions are spent on level "me" and "it" without trying to change workers' values, beliefs, sources of commitment, and energy when reacting to dynamically complex issues and thus reorganizing current structures and processes. While this approach may work fine and seem appropriate to solve relatively simple problems, it is not robust enough to solve problems that require adjustments in problem-solving processes. For example, according to the *Harvard Business Review*, during the 1990s, about 70% of businesses that launched projects using reengineering as a problem-solving methodology failed (Strebel, 1996). This high failure rate was because managers involved in the system behind the problems relied on a mechanistic approach toward problem resolution, and did not rethink or reframe the problem or make the necessary adjustments in their problem-solving thinking processes. The same difficulty can occur when people do not implement the five disciplines in systems thinking. To see how the system creates the actual problems, it is necessary to shift their mode of thinking into the "I in you" or "I in whole"

levels. These deeper levels of attention help provide people with the tools and self-confidence to practice the five disciplines and thus adjust their modes of thinking.

c. The Deepest Attention Movement in Theory U

The deepest attention movement in Theory U can be seen in Figure 20. The movement includes encountering problems with attention level “me,” observing the current condition while going to a deeper level of attention, conducting self-reflection, paying attention to presence when reaching the deepest attention level of learning from determining a desired future as it emerges, and creating organizational reform without any organization force or crisis compelling the change.

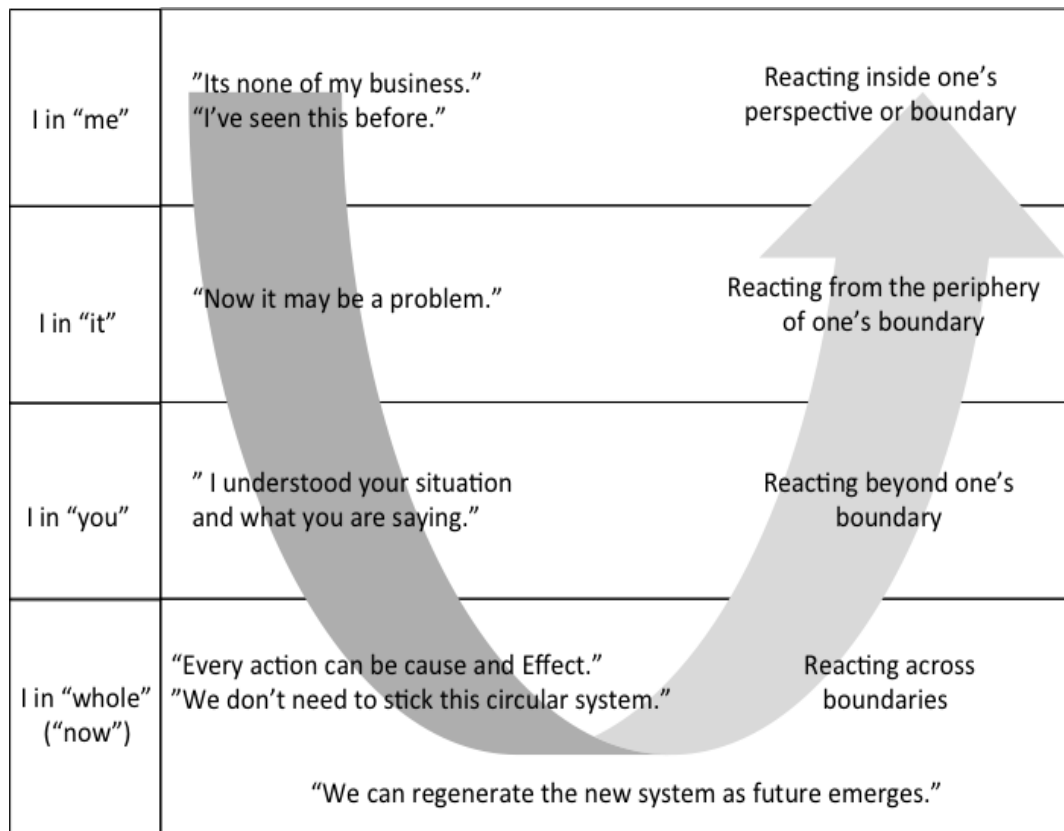


Figure 20. Deepest Attention Movement (After *Theory U*, 2009).

In this deepest attention movement in Theory U, the left side of the U downward movement corresponds to the systems thinking process in which one can see the whole system accurately (as seen in Figures 13 to 16). In the bottom of the curve, people see an image of a new future while using the discipline of “personal mastery” and the “presence” concept to focus exclusively on the current set of organizational circumstances without bias or reliance on past experiences. Logically, it is ideal to not rely at all on the past, but realistically, it is difficult. Therefore, avoiding reliance on the negative past as much as possible is aimed for first. The less one relies on the negative past, the more likely chronic problems will be solved. The less one relies on the past, the more creativity will increase. The right side of the U upward movement is the process that develops feasible solutions for individuals using the disciplines of “team learning” and “shared vision” in systems thinking. In sum, the process of progressing up the Theory U curve is the act of creating the future people want to have through the problem-solving process. Specific examples of these processes are the same in the section of Four Attention Levels in the Inner Place.

F. IMPLEMENTING THEORY U

There are seven processes in Theory U (see Figure 21). Understanding these processes gives insight into leadership and management capabilities required to implement the theory.

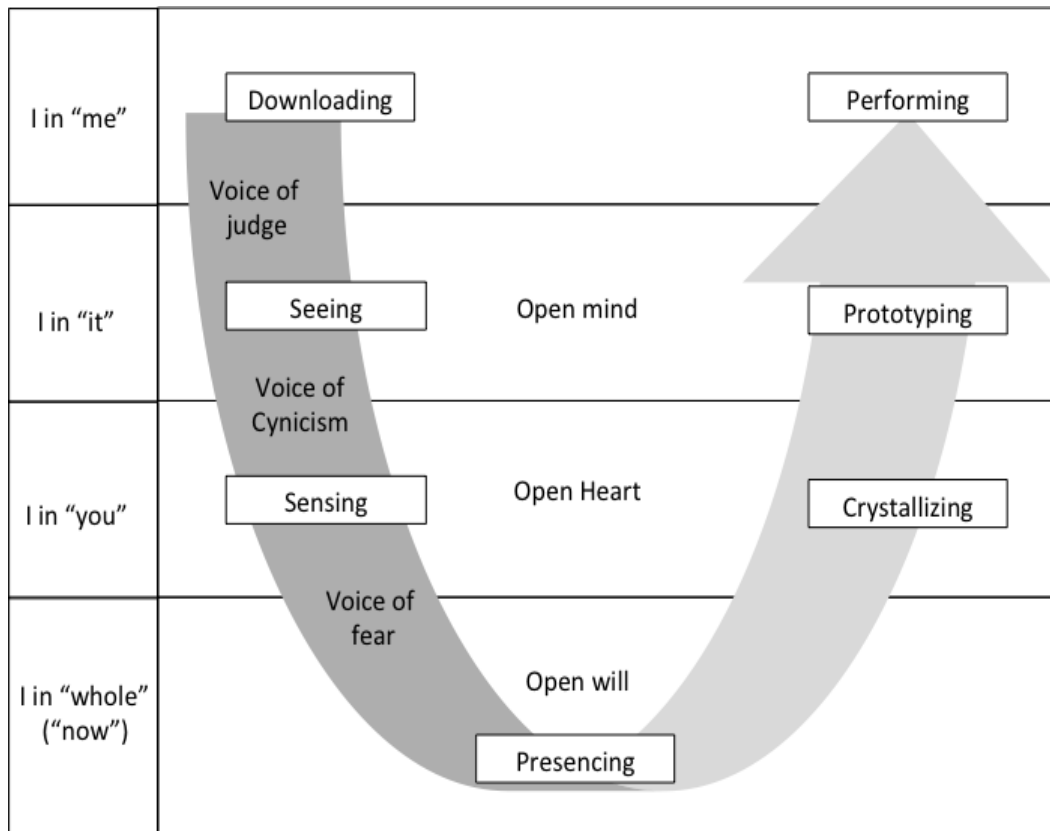


Figure 21. Seven Processes of Theory U (After *Theory U*, 2009).

1. Downloading: Attention Level "Me"

Downloading, located at attention level "me," is defined as thinking about and solving problems using one's own perspective based entirely on past experiences. When downloading, all one's attention is focused on one's own thoughts about the problem.

a. *The Negative Effect of "Downloading"*

When attention is focused exclusively on downloading, organizational reality and one's interpretation of that reality are easily confused. When the factors that cause the problem are outside a manager's perspective or customary frame of reference, ignorance, denial, and a failure to think about the problem in new ways can occur. As a result, a manager's typical problem-solving perspective persists as the following examples indicate.

Examples of downloading and the situation created by it include the following:

- Each department in the supply model only thinks about its own needs, instead of looking at system fundamentals, and reacts only to easy problems to protect its own interests. Even when they see original ideas, managers ignore them. For example, in 1980, an American car manufacturer saw car factories in Japan which had no inventories, but they rejected the idea that factories could operate on a “just-in-time” inventory system.
- People in the field, factories, and front line believe that high-ranking personnel do not know their field and do not understand the situation. Consequently, they do not say what they think in front of high-ranking personnel.
- Talking only about harmless and inoffensive things that are irrelevant to the root problem during meetings.
- High-ranking personnel, when coming up with their own schemes, do not look at potential effects because of the time lag which occurs before the effects can be seen.
- Over several years, the same problems and potential solutions are always being discussed at meetings.

b. How To Avoid “Downloading”

When people are caught in their own perspective, it is difficult for them to step outside that perspective because they have become passive due to their reliance on personal and organizational routines to think about and solve problems. Therefore, Theory U tries to avoid downloading by creating situations where people can break out of their organizational routines. Some of these methods include the following:

- Brainstorming and extending the time available to come to a decision
- Recognizing how easy it is to fall into “downloading” (in terms of denial, tension, or being unable to progress as one wishes)
- Knowing the behavior patterns associated with “downloading”
 - Judging information at once as to whether it is important or not
 - Dealing with new information as if it is already known
 - Forecasting the conclusions of discussions while other people are speaking
 - Focusing on making the counterargument in one’s mind while people are speaking

Scharmer explains that these behavior patterns come from our “Voice of Judgment” (VOJ).

When one person starts downloading, other people do not listen, and start downloading in the same way. In the long term, “downloading” spreads and takes over decision-making thinking and processes. For example, due to downloading, workers may not notice significant organizational problems that require immediate attention even though those problems would be obvious to someone outside the organization.

2. Seeing: Attention Level “It”

Seeing is a state in which a manager is completely transfixed on events transpiring in his or her vicinity. This is the starting point of problem solving. Although in this state the perspective stemming from past experience has not changed, the focus of attention is being directed on the event at the boundary of the manager’s perspective. Of course, on the boundary of perspective, it is hard to judge the problem. It is similar to the situation when it is hard to see clearly at the boundary field of vision because of the limitations of our eye lenses. At this attention level, people start to focus on the problem with less judgment caused by their own perspective and thus can stop downloading.

Specific examples of the Seeing state are the following:

- When an aircraft becomes unusable due to a part failure just prior to flight
- When a supposedly unbreakable part breaks
- When one learns that there is no stock of a part in need
- When one discovers an unprecedented trend of failure in a vital part
- When one decides to outsource a complex problem because of an inability to understand the true nature of the problem
- When one realizes which past perspectives and emotions create the VOJ

3. Sensing: Attention Level “You”

Sensing occurs when the boundaries between observers and subjects begin to disappear. By viewing problems and data from others’ perspectives, it becomes possible to understand others’ judgment better as well as one’s own reasons for reacting to the

problem. Senge insists that this change from seeing to sensing is the starting point to understand the real system and its interrelationships behind problems. Specific examples of the sensing state include the following:

- People in the field, factories, and front line believe that high-ranking personnel do not know their field and do not understand the situation. High-ranking personnel think in the same way. Consequently, they do not say what they think in front of others. When one discloses one's real feelings that one gained through reflection toward a problem through dialogue-type meetings by self-disclosing real feelings toward the problem, others similarly may self-disclose, resulting in decision makers understanding their decision assumptions and thinking processes
- An open heart—This does not seem to be related to organizational problem solving; however, it is really key to reaching a sensing state in Theory U. It can be used as a tool to gauge people's attention level for facilitators of Theory U. People use their heart for perceiving thankfulness and love. In other words, "open heart" refers to a state where it is possible to access the genuine kindness everyone has and understand and truly feel the feelings that others cannot put into words. Therefore, it is a good sign of sensing when people start to ask why others are in pain or are hurting from problems.

It is not easy to understand how other people's feelings influence how they understand a complex problem. Furthermore, because many organizations divide workers into separate functions where there is minimal interaction between functions, people cannot clearly see the entire "problem space," and thus have the tendency to focus their attention on the problem area with which they are most familiar. Therefore, Theory U tries to attain sensing by creating situations where people can move their attention from a seeing state to a sensing state. The following situations can help create this sensing state:

- Taking time in meetings to make it possible to reflect on and discover the deep and genuine intentions and mental model that one would not normally notice.
- Taking time for self-disclosure through a combination of reflection and active listening to others' reflections. This process can enable managers to vicariously experience other managers' experiences so they can understand each others' deep and genuine intentions and emotions.
- Considering the effects of one's actions by overcoming one's own perspectives and boundaries in order to realize that one is part of a circular system.

- Withholding the Voice of Cynicism (VOC). There is need to become aware of the mental model that creates VOC. VOC is the inner voice of resignation produced by the mental model cultivated by past experiences, particularly negative ones. If these experiences are strong and recurring, they will become undisputable truths to managers. For example, beliefs that “there is no budget for this improvement” or “foreign aircraft take much more time to repair” reflect the VOC.

4. Presencing: Attention Level “Whole”

Presencing represents the attention level where the problem is seen not as an extension of the past, but as a possibility of creating a new future that can be implemented in the organization. Although presencing is similar to sensing, the attention is at a far deeper level than sensing. In the presencing level, people’s attention is entirely on the new organizational state that is being created rather on tools, methods, or existing objects. Presencing focuses entirely on “something new” that people wish to create and the emotion or feelings associated with that creation, not the knowledge that they already possess, to maintain current organizational systems and processes.

For example, presencing is equal to seeing things with everyone’s lens and everyone’s way of focus. Because perspectives are made from one’s past experiences, to shift to another’s lens and see through it, is to understand others’ judgments through others’ past experiences. When one understands others’ judgments correctly, one no longer needs to cling to one’s past experiences and judgments, so it becomes easier to create breakthrough ideas unbound by the past. To reach this state, one often feels the fear of losing one’s past experiences and judgments including past achievements, and the fear of having nothing to rely on. Because the information of everyone’s past experiences is so important to their individual and organizational identities, this process will take more time compared to the sensing state. Especially, if people are not openhearted to others, it will take an extremely long time to understand others’ past experiences and judgments. Specific examples of the presencing state are listed below.

After the fear of relying on former experience has passed and managers recognize they cannot rely on that experience to solve these complex problem types, breakthrough ideas can be born. There can be two kinds of ideas. One kind is completely different from

existing ideas because people let them come without relying on good or ineffective mental models that created the existing ideas. The other types are inclusive ideas that cover all existing ideas because they result from all stakeholders' mental models that helped create existing ideas. In the case of production, the first kind of idea is the draft idea for a new device that has a completely new function, and the other kind of idea is represented by a new multipurpose device that includes all existing functions in the market.

People may interpret these ideas as feelings or abstract intent before they become a solid, understandable vision. Therefore, these ideas can be clarified through talking with other people because they can interpret these ideas beyond individual boundaries in this state. Specific key feelings to recognize during the presencing state for Theory U practitioners or the master of meeting facilitation of Theory U are the following:

- Feeling of fear of losing identities. All participants in the meeting feel the necessity of casting away the habitual self and achievements based on their past experiences.
- Feeling of entailing deep silence. All participants in the meeting cannot talk easily and need to think silently.
- Feeling of open will: Accept the idea born of the spontaneous act of awareness, not of conscious decision made based on past logic.

This state involves doing what one wants to do without depending on past experiences and judgments. In other words, the state refers to a situation where one thinks and acts on the future one desires, but has not believed in until then. This “future” is neither an extension nor an optimization of the status quo. For example, presencing is similar to creative arts activities, such as drawing and making songs, and thus everyone has experienced a presencing state. An achievement of something that no one believed in has already undergone the process of presence. When one realizes the changes in things such as history, seasons, and weather that are usually unnoticed, this realization of changes is also a state of presence. However, depending on the perception of a person, this presencing state may or may not be noticed. For example, people can fail to notice the presencing state if they focus only on the common sense or physical phenomena, or if

they are used to living with the ideas taught in school or depending on the ideas of others, such as parents. In such situations, one will not think of the “future” that one has not yet believed in.

Once people have experienced presencing or are aware of that experience, this state is readily understandable. Therefore, managers can experience and recognize presencing by creating situations where people can move their attention sensing state to a presencing state. Specific activities to attain the presencing state include the following:

- Continue to question oneself about the highest possibility of who one is, and what one should work for during the entire lifetime. (Pursue personal mastery). Before trying to solve the problem, think first from whose perspective to judge, and with the attention on whom. When one understands others’ judgments correctly, because one no longer needs to cling to one’s own past experiences and judgments, one can adapt to problems, and a situation occurs where it is easier to generate breakthrough ideas unbound by the past. The more the stakeholders understand others’ judgments, the more easily they can make the overall intent to formulate ideas.
- Rather than stepping back and viewing a phenomenon from a larger perspective, observe each phenomenon closely through repeated observations, to find systems lying behind all phenomena. For example, rather than listening to the judgment results of all the stakeholders associated with the problem and putting them together, by listening carefully to the past experiences that brought about that judgment, others’ judgments can be understood correctly. This eliminates the discordance in the team that is making solving a complicated problem difficult, and makes it easier to find the system that is creating the problems.
- Have meetings where everyone agrees to try to talk without judgment, ego, and habitual routines. When there is the feeling of protecting one’s past experiences and judgments and where someone uses his past experiences to judge another’s experiences, people will not speak their honest feelings. Make a rule promising to avoid these meeting dynamics, and begin the meeting for solving the problem with participants agreeing with this rule.
- Let go of everything but necessities, and yield to its changes. Let go also of attachments to things one self-identifies with. After understanding all stakeholders’ judgments correctly, all stakeholders do what they want to do as a whole, without using their individual past experiences and judgments. In other words, it is acting to create a future that one has not believed in until now but wants to create, and one which is not an extension or optimization of the present situation.

- Switch one's inside of the boundary to the outside, and the outside to the inside. Everyone understanding others' judgments is to share one's judgment with others without imposing it, and to accept rather than refuse all outside judgments.
- Reserve the Voice of Fear (VOF). In presencing, one must bear the risk to create what is not the extension of the past. Often the fear of losing one's identity is born. Not using one's past experiences and judgments means one must not try to bring in one's positions and achievements of the old system into the new system one wants to create. One must think with the intent of discarding them. However, when one properly understands others' judgments and the negative system, one realizes that one's positions and achievements also were a part of the mental model, and when one understands to the point where the mental model is unneeded, the fear suddenly disappears.

5. Crystalizing: Attention Level "You"

Crystalizing is the process of making a core direction from the best future idea that people get in presence, with every stakeholder crossing his or her boundary. This core direction gives a new perspective to decide the priority order. This priority order aims to minimize laborious effort and maximize desirable effect and create a sustainable system in the every stakeholder. A common organizational assumption is that senior leadership develops and communicates the vision, and the remainder of the organization implements it. Crystalizing operates from a different assumption; senior leadership and other people can develop and communicate the vision together because they get ideas through presencing with full understanding and the empathy. Specific examples of the crystalizing state are the following:

- In the aircraft supply chain model, each department will redefine its priority order based on the new core direction. Typically, each department controls its own inventory and supply services based on their priority order. In the past, there was a core direction of departments in the supply chain withholding information concerning each other's interests. When different possibilities were found through presence, a new core direction was made that can bring desirable results to each department if they share information as a whole supply chain, and if they are able to cooperate. Crystallizing is the process of making this new core direction.
- Core direction is not something people create from concrete ideas but rather something that becomes apparent from a feeling similar to creative activities. When doing creative activities, people completely focus their attention on the new ideas that they try to produce, and try to shape these

ideas. Crystallizing is the starting state of this creative activity. When starting creative activities, one does not determine the finished product at once, but one begins to think outside the box, or begins to describe the image. In the case of meetings, participants believe in new possibilities, and write out that core direction's overview, rather than preparing or evaluating the core direction's content in a perfect way.

- The important aspect in the crystallizing state is not the core direction's content, but how it is made. If it is made by the idea based on the presencing state, people can create something completely identical to the existing core direction. Even though people see the same core direction, for example, with the same priorities such as "safety first," "operation first," "budget first," or "balance first," people will react in different ways. People can easily adhere to the core direction created from the idea that was gained in the presencing state with understanding rather than the core direction from an unknown person's new idea. Saying customers' safety comes first to avoid recall cover-ups, will not be taken seriously by anyone if it is only in words. It will only be thought of as bad luck for the person whose cover-up was exposed. The moment the core direction says fundamental reform, it is the same. The important essence of crystalizing is not the value of core direction but how it was made. Therefore, creating core direction through presence is called crystallizing.

Therefore, the key to attaining a crystalizing state in Theory U is to maintain the idea that was gained in the presencing state. People need to connect themselves to the presencing state while they are making a core direction and need to go back to the presencing state for each attempt at crystalizing. It will let people know what they truly want to create, do what is necessary to achieve it, and obey it with positive, autonomous determination.

6. Prototyping: Attention Level "It"

Prototyping involves giving form to the inspiration and ideas derived from presencing. People react from the boundaries or constraints created by their individual and organizational mental models and the problem-solving and decision-making routines these models reinforce. In attempts to create something groundbreaking, innovators have already derived inspiration and ideas through the presencing state or are able and willing to go to the presencing state to find a good idea and engage in a trial-and-error process (deep U movement) to test and refine their ideas. On the other hand, non-innovators are unable to reach a state of presencing, and they attempt—through trial-and-error—to

create something that seems only superficially of organizational value (a shallow U movement). Prototyping refers to the actions of the former, and to properly engage in prototyping, it is essential that one has ideas and inspiration derived from presencing.

It is also essential to learn through the trial-and-error process how to find a good method to give form to an idea. One must be aware that it is impossible to find a good method from the beginning. Both those at the work site as well as at headquarters must understand the purpose and value of this trial-and-error process. Without management support, no one will seriously engage in these important trials, or the person responsible for coming up with the idea for the trial will be subject to criticism the moment the trial does not go according to plan. With this criticism, it is difficult to get the best results from prototyping. This phenomenon can be seen in the 3M “sticky note” invention, in which the process of making strong glue lead to today’s sticky note, an invention that would be otherwise have been impossible if the failure of the strong glue had been criticized.

Prototyping is a very common process in organizations. For example, military aircraft logistics are always prototyping new methods of maintenance and supply, and ways to improve them. Some specific examples of effective prototyping processes from members of SoL and the Presencing Institute are provided here:

- Deep Dive methodology (Horwath, 2009): Brainstorming product or process developments to rapidly immerse a group or team into a situation for problem solving or idea creation (Morrison, 2010). In Theory U workshops, they teach prototyping through using the ABC News story about the IDEO shopping cart (Nakadoi, 2014), which can be found at <https://www.youtube.com/watch?v=M66ZU2PCicM>.
- Short Cycle feedback: Tests should be run on the prototypes with the goal of 80% accuracy in order to get more feedback rather than focusing on improvement of prototypes quality by more than 80% (Scharmer, 2009).
- Protection for the prototype: The new prototypes for products or systems are often embedded in the current infrastructure based on the past system. In which case, the new prototype system may face opposition if it exists independently. For instance, the current system’s immunity functions will react and remove the new prototype system. Therefore, prototypes need protection (Nakadoi, 2014).

- Getting the bona fide: A Costco manager in the company's sustainable food laboratory said that the bona fide demand requiring the prototype's services is embodied within those who use the service. An environment is in place in which the service provider and users can meet with each other face-to-face (Scharmer, 2009).

A key to attaining a prototyping state in Theory U is to keep the idea that was gained in the presencing state, or always to be ready to go to the presencing state when people find the need for a good idea. As an item or service that is not a direct continuation of past efforts is in the process of being developed, the response of those located in departments or jobs possibly related to the development work will also change. At times, departments that were expected to provide assistance fail to do so, while help is sometimes provided from rather unexpected organizational sources. People need to take advantage of these opportunities to help innovators by being aware when the opportunities do appear and by being sensitive to the actions and support required to nurture the product, process, or conceptual innovation.

7. Performing: Attention Level “Me”

Performing is putting the concept, process, or theory into practice. People react inside their perspective or boundary when performing. A sense of unity based on understanding the whole perspective and attention that were gained in the presencing state is always felt when performing with a deep inspiration gained from presencing. With performing, the effective results like providing quick and responsive service, earning a good reputation, negotiating smoothly, and getting quick results and help from others are gained because performing is practiced while involving the people nearby to one's action through their positive commitment. Specific examples of the Performing state include the following:

- The situation when making a speech where one feels the entire audience is focusing on each word and the speaker believes she can choose the right words to keep the audience focused. This condition reflects the feeling that one has “the audience in the palm of her hand.”
- The situation where, in martial arts and sports competitions, one can sense the other's movements as if they were one's own, and can respond accordingly.

- The situation where, in the leadership of an organization, the leader senses the other members' attitudes, beliefs, and concerns toward a particular initiative, and rather than pulling, prodding, and perhaps even manipulating the members to support and implement the initiative, coordinates interactions so everyone can work "fluidly" toward implementation of the initiative.
- The situation where people performing simple tasks feel the true importance that the task brings to all members and thus perform those tasks with a high level of motivation and even more effectively.

When starting something new in an organization, often other organizational members take the attitude of "let's see what you've got." They also may try not to be involved for fear of becoming a nuisance, even though they want to help. When this situation continues, the mental model that it is better not to be innovative develops. To counteract formation of this mental model, it is important that one experiences presencing early on in a process of solving problems, and be able to engage other people in the innovative vision. Therefore, to implement performing, people need to feel presence, to believe in and engage others in the inspiration and ideas gained from presence, and to train themselves to be able to provide good performance.

8. Summary of Systems Thinking and Theory U

Systems thinking is characterized by viewing the act of problem solving and the act of learning and transforming oneself as the same act. The act of learning and transforming oneself requires use and mastery of the five disciplines to understand the problem-producing large and circular systems, and to recognize that one is in the system and, as a result, is partly the cause of the problem. This learning and transformation process results in fundamentally different modes of thinking about, responding to, and analyzing complex problems

Theory U views the act of problem solving and the act of creating innovation as the same act. The act of creating innovation is to transfer one's attention to something large and beyond one's perspective and to attempt to overcome the boundaries created by personal and organizational mental models, thus gaining inspiration from the process of creating the innovation and ultimately helping to generate the action needed to implement the novel concept, process, or product.

These two theories both share the goal of solving problems, and share the approach of viewing oneself from a larger perspective to generate workable solutions. Systems thinking explains the problem-solving concept that focuses on the necessary elements of human nature, and attempts to study and transform human nature itself. Theory U, on the other hand, instead of analyzing the human nature, explains the steps and process to develop it. Therefore, it may be said that systems thinking is a base concept, and Theory U, a framework or a tool.

Many people and organizations are pressured to force rethinking and restructuring because of changes in their business environments. However, what both theories aim for is not these forced transformations, but ongoing individual and organizational learning and transformation in which creating innovation is not a response to a crisis but a natural product of ongoing organizational work. Therefore, there is a note of caution related to both theories. If leaders force these theories on their employees in the same way as they have done with usual management tools, then leaders will cause implementation of these concepts to fail because both theories require voluntary ongoing practice. Therefore, to practice this theory, senior leaders need to provide the education and environment for ongoing practice and the patience to wait for the ongoing practice to become part of organizational thinking and action.

III. JAPANESE MARITIME SELF-DEFENSE FORCE AIRCRAFT LOGISTICS

This chapter introduces the Japanese Maritime Self-Defense Force (JMSDF) aviation supply and maintenance challenges. The organization's structure, organizational management, and general problems will be examined, as well as the organizational systems and system dynamics that consistently impact JMSDF problem-solving behavior.

A. THE ORGANIZATIONAL STRUCTURE

As shown in Figure 22, Maritime Material Control (MMC) handles logistics for the JMSDF under the direction of the Maritime Staff Office (MSO) (Self-Defense Forces Law, 1961). The MMC plans, coordinates, and oversees logistical support operations. MMC also ensures the supply and maintenance of equipment, including corresponding parts and ammunition. More than simply managing supply lines, the MMC maintains logistics quality through quality control, technical development for maintenance, and other operations. The MMC carries out a wide range of tasks under the umbrella of logistics.

Logistics for installed equipment is handled by the Air Supply Depot (ASD) under the direction of the MMC (Self-Defense Forces Law, 1961). The ASD manages the repairs and supply of aircraft parts (Maritime Material Command, 2013).

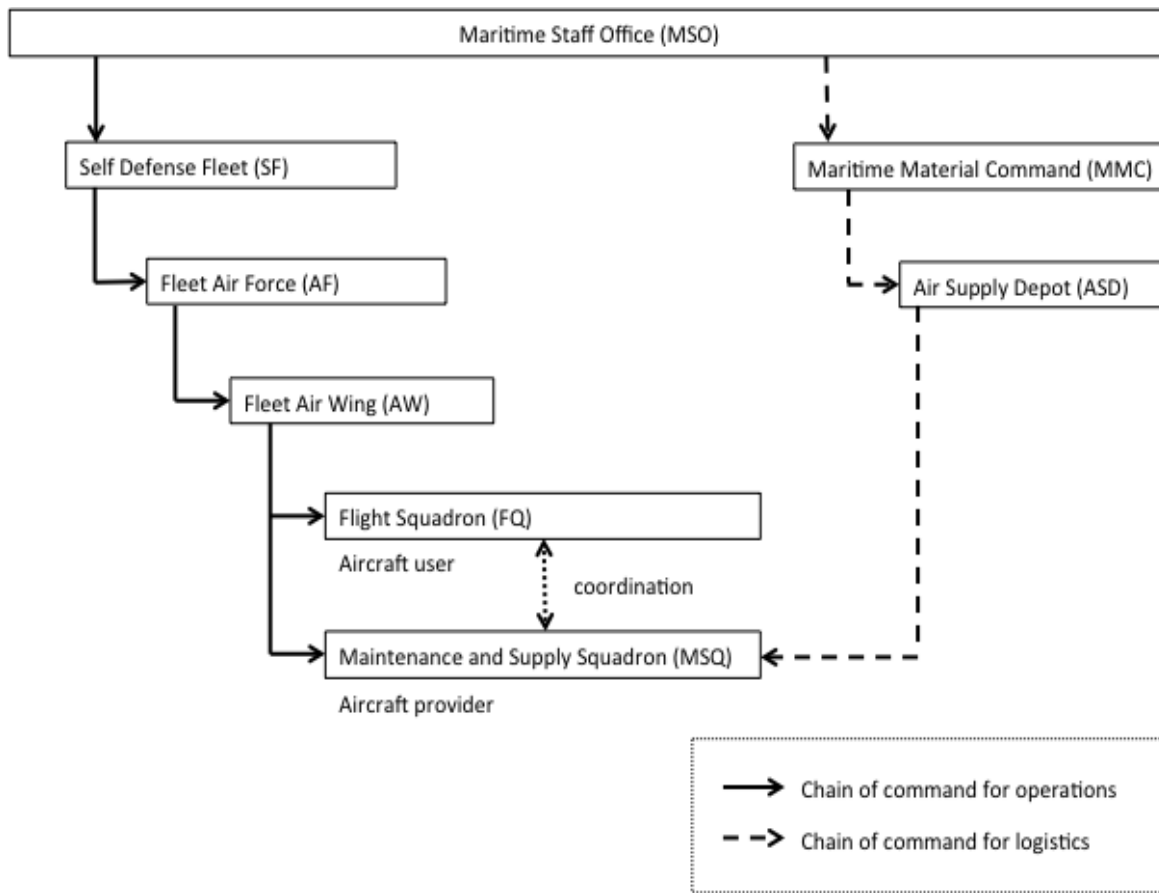


Figure 22. Organization and Operational System of Aircraft Logistics (After Ministry of Defense Japan, 2012).

The smallest aircraft mobilization units from the perspective of aircraft logistics are the Flight Squadron (FQ) and Maintenance and Supply Squadron (MSQ) (see Figure 22). The MSO directs both commands for operations and logistics. The FQ uses aircraft by order from the operations chain of command, and the MSQ maintains and supplies aircraft through support of the logistics chain of command. The organizations on the right side of the chart establish the logistics structure of the MSQ.

Generally, operational demands are sent to the MSQ from the FQ by flight schedule. To carry out the flight schedule, the MSQ develops and implements maintenance and supply plans for the aircraft. The MSQ also responds to unscheduled aircraft malfunctions that occur during operations.

Unscheduled maintenance, supply, and repair must be performed when malfunctions occur. As there are limits to physical maintenance ability, parts inventory, and repair budget in a fiscal year, unscheduled malfunctions are responded to in order of priority. When MSQ cannot respond within their range of jurisdiction, the superior agencies—ASD, MMC and MSO—of the logistics chain of command will respond to the demands.

B. COMMON PROBLEMS OF AIRCRAFT LOGISTICS

Due to the sophistication and high technology of equipment and the depreciation of current equipment, the costs required for maintenance are increasing. A significant challenge will be taking into account the increasing financial costs, while at the same time containing the maintenance costs (Ministry of Defense Japan, 2011) (see Figure 23).

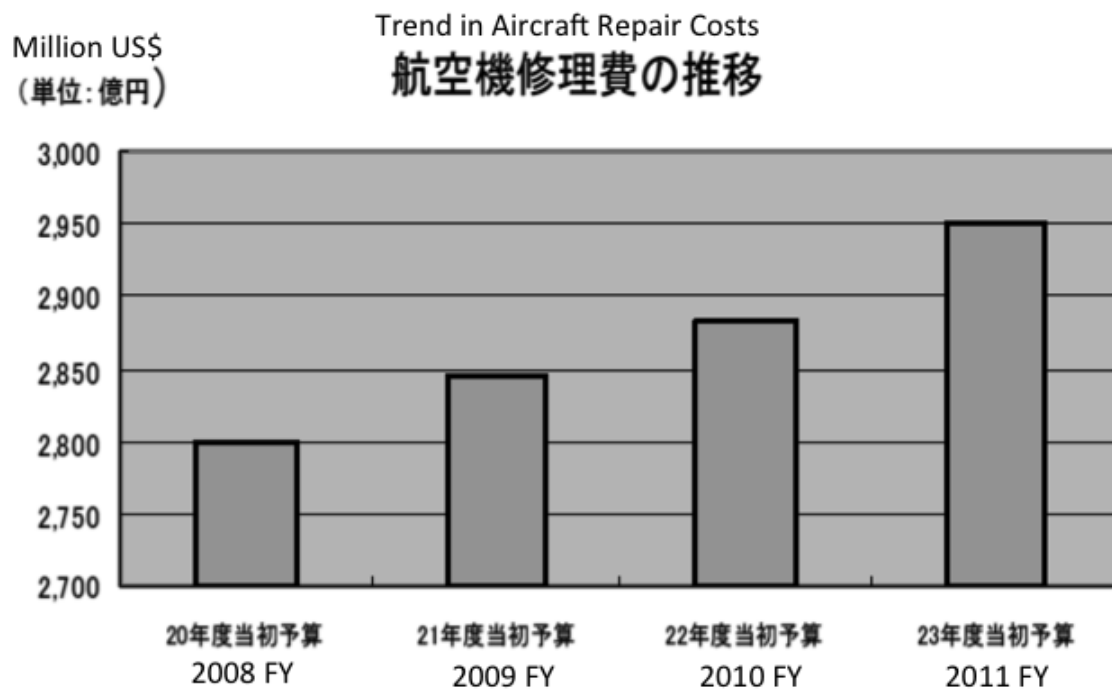


Figure 23. Trend in Aircraft Repair Costs (From Ministry of Defense Japan, 2011).

As a counter measure for increases in aircraft repair costs, the Ministry of Defense attempts to contain its maintenance costs. This can be one of the dominant mental models.

The Ministry of Defense can react to increasing financial costs, because containing the maintenance costs is conducted constantly prior to this issue occurring.

There is chronic low-operational availability in aircraft models with fewer than ten aircraft per model. The effect that one plane's malfunction has on operations is much greater than models that have a large number of aircraft—more than 30. Because aircraft models which are fewer in number have a smaller total inventory than the aircraft models of larger quantities, and because of the difficulty of diverting parts within a smaller number of aircraft, there is chronic low operational availability.

Because the JMSDF has purchased many aircraft from overseas, it often takes several months for the parts to be supplied, due to a long inventory lead time. This situation creates major problems for supply. Unscheduled repair of overseas parts often requires a year from the time the parts were authorized via a contract to completion of the repair. If a malfunction occurs in the latter half of the fiscal year, it is extremely difficult to finish the repair within the fiscal year because of the contract procedure. If the repair takes almost a year, it is better to fix the part in the next fiscal year because JMSDF needs to finish every contract for parts repair within a fiscal year.

There are also problems related to reliability of parts. Because foreign made and new aircraft often break down sooner than expected, the reliability of the parts is lower than planned, and a shortage of supplies occurs.

One of the JMSDF aircraft logistic cases, MCH 101, will be explained section E, where Theory U will be applied to this aircraft logistics case.

C. HUMAN NATURE DEVELOPMENT SIMILAR TO FIVE DISCIPLINES

Training about not only human motivation, mission requirements, management responsibilities, and leadership but also human nature, similar to the five disciplines, is conducted based on the Self-Defense Forces Act, Article 52, "Purpose of Duty," and according to "a self-defense official's **compliance**," which outlines the self-defense official's fundamental attitudes regarding awareness of the mission, personal fulfillment, fulfilling one's organizational responsibility, strict observance of discipline, and

strengthening of organizational unity. For mobilization units, these instructions are included in the work plan, and education is usually included through lectures complying with the outlines that are conducted by officers in each mobilization unit.

In 2007, subject to frequent scandals involving the Self-Defense Forces, the Ministry of Defense set up the Council for Ministry of Defense Reform in the Prime Minister's Cabinet. A council report stated, "The organization of and decision-making within The Ministry of Defense and the Self-Defense Forces will be re-structured. To this end, the overall team is in need of a strong, shared sense of purpose and resolution, and the spirit to face these scandals in unity" (Council for Ministry of Defense Reform, 2008).

A notable part of the statement added "to believe that the organization can solve every problem related to scandals by only strengthening management is a form of dark nationalism." Such a philosophy lacks a true understanding of human motivation and nature. This denies the conventional countermeasure of only strengthening management, and suggests the need for insight into human nature. The countermeasure with insight into human nature is to "have a sound and positive goal as the main vision in the organization to suppress negative deviations that cause scandals. In addition, to this, the leaders must support everyone who cooperates in heading toward this goal" (Council for Ministry of Defense Reform, 2008). The principles of "compliance with regulations" and "establishment of professionalism" were presented to individual members. In addition to changing their actions as an organization, the principle of "establishing management that prioritizes performance of duties that aim for total optimization" was presented (Council for Ministry of Defense Reform, 2008).

"Shared sense of purpose and resolution," "the actions of the whole organization," "for total optimization," and "personal fulfillment" are similar to systems thinking's five disciplines. However, the JMSDF does not provide structured education in systems thinking similar to that provided by many for-profit businesses.

D. USUAL BUSINESS TOOL APPROACH

The Ministry of Defense has made efforts to implement necessary measures, such as streamlining and rationalization of the procurement and supply of equipment and materials, due to changes in the acquisition environment in the form of higher prices, the increasingly high-performance nature of equipment, and the recent harsh fiscal situation (Ministry of Defense Japan, 2012). Among these efforts to implement necessary measures are the following:

- Strengthening of Life Cycle Cost (LCC) management
- Expansion of the Incentive Contracts System
- Efforts to curtail costs
- Equipment acquisition by the IPT (Integrated Project Team) system
- The introduction of PBL (Performance-Based Logistics)

Contending with increasing and changing financial costs is becoming more and more difficult, even though the policy of containing the maintenance costs is working.

E. JMSDF AIRCRAFT LOGISTICS CASE FOR MCH-101

There were many proposals made by all logistics areas, including suppliers, to solve the future logistics problems of MCH-101, and thus increase operational availability. Extra budgets for the proposals were allocated from the budgets for other aircraft, even though the operational availability of other aircraft was affected. Although some of the proposals seem to be working, lack of supply part problems remain. In fact, this logistics model is still contributing to a chronic lack of supply parts.

1. Background

MCH-101 is a new airborne mine countermeasure (AMCM) and transport role helicopter for JMSDF made by AgustaWestland (AW) (a European company), and is replacing the MH-53E made by U.S. Sikorsky. To reach the total number of helicopters needed for the aircraft's mission, the MH-53Es are being replaced by MCH-101s (Ministry of Defense Japan, 2002).

MCH-101 helicopters have been deployed to flight squadrons since 2007, and five were in use as of March 31, 2013 (Ministry of Defense Japan, 2013). According to the Cabinet decision for the Mid-term Defense Program (covering the fiscal years 2011–2015), five more MCH-101 helicopters are due for deployment in 2015.

The MCH-101 is produced domestically by Kawasaki Heavy Industries under license from AgustaWestland, and is the prime contractor for the Maritime Self-Defense Force. Apart from licensed production and foreign military sales, the procedures for open tender are in practice, and the contract procedure remains openly competitive (Ministry of Defense Japan, 2013).

2. Problem

The MCH-101 has had many problems with operational availability. For example, the lead times for supply of parts or repairs manufactured overseas for the MCH-101 are about twice those for the MH-53E; consequently, the operational availability of the MCH-101 drops. Therefore, performance-based logistics contracts are being enforced for certain spare parts, and cost reductions are being advanced (Ministry of Defense Japan, 2011). Despite these changes, this logistics model still has a chronic lack of supply parts.

When the MCH 101 replaces the MH-53E, the number of required ground crew does not necessarily increase, and so ground crew must acquire the skills to work with both the MH-53E and the MCH-101, which imposes a significant burden on them. As a matter of practice, the MSQ maintenance crews also conduct heavy maintenance for the Education Ministry's aircraft CH-101 in support of Antarctic exploration after the aircraft returns from its missions. The biggest problem is that the CH-101 heavy maintenance period overlaps with the MCH-101's heavy maintenance period.

It seems obvious that the MCH-101 would face lower operational availability from supply and maintenance than that expected by JMSDF. For the MSQ, it was also obvious that the various types of logistics support required would not be available to answer the operators' demands.

An additional problem is that it would be difficult for the MSQ to solve these problems through its own initiatives because many of causes are not related to their organization. Figure 24 describes the problems and shows the relationships and fundamental causes within JMSDF by breaking down the problem into its major components.

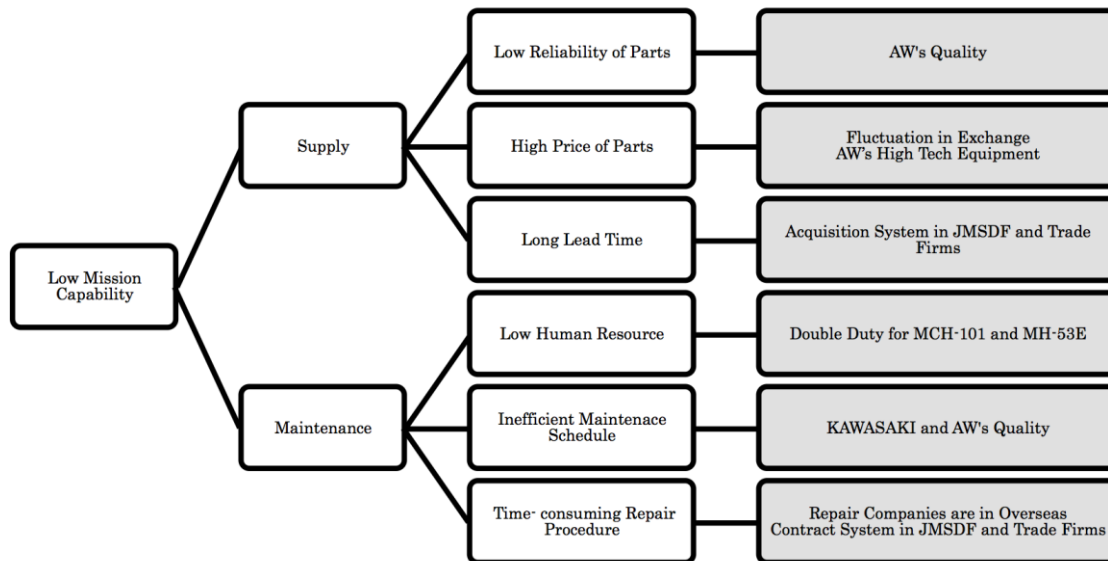


Figure 24. Problem Analysis.

According to this breakdown, these problems are mainly caused by supply, maintenance, and stakeholders (white column), suppliers, vendors, and internal issues are shown in the gray column. In addition, these problems take a long time to fix because some of them are related to quality of parts that need to be changed at the design level, and some of them are related to the contract procedures that need to be changed at lower levels. Therefore, the MSQ, which is tackling this problem as an immediate short-term challenge focusing on daily and monthly operations problems, is also confronted with problems that cannot be solved unless they are dealt with in the long-term—more than a year.

3. Proposal

From a logistics perspective, most proposals focus on improving lead time and reliability of supply parts and maintenance, which are the bottlenecks in the logistics system. From the MSQ's perspective, some proposals focus on immediate responses, such as outsourcing, asking Kawasaki to conduct heavy maintenance (instead of MSQ), and purchasing additional parts for inventory to overcome the concentrated period of operational demands. For example, the MSQ conducted a survey to determine which kind of maintenance took the most time, so as to improve operational availability. The answer was the main rotor head (MRH) during Big Phased Maintenance. It would be good to obtain another MRH because the MSQ could save time for maintenance of MRH during phased maintenance. The maintenance team could use a new MRH immediately and conduct maintenance inspection for the old MRH when they had time. They also could ask other teams to conduct maintenance inspection for the old MRH, so that original team could conduct remaining phased maintenance inspections, instead of using time on the MRH, and could shorten the total hours for phased maintenance. Therefore, the MSQ has proposed having one extra MRH to reduce the labor for MRH inspections of one maintenance team during phased maintenance for whole aircraft inspections.

4. Results

Although the proposal was authorized by Fleet Air Force, Maritime Material Command, and Director General of Logistics Department, it did not work for several reasons.

a. Suppliers Did Not Provide a Complete MRH

It was difficult to purchase a complete and assembled MRH. Suppliers in Japan did not have the MRH in their warehouses because its price and holding costs were too expensive. In addition, they could not obtain a complete MRH from AW after the proposal as AW had their own priority supply system for their customers around the world. In this system, JMSDF did not have sufficient priority to obtain a completed MRH within JMSDF's fiscal year. Suppliers in Japan could not bring the MRH to JMSDF because there were other organizations who had bigger contracts with AW and who were

paying more money to AW than JMSDF. Instead of the complete MRH, Japanese suppliers provided an incomplete MRH with only small parts, which they could purchase in the fiscal year or they already had in their warehouses.

b. The Incomplete MRH Became a Supply Parts Donor

To achieve the first purpose of the proposal, the MSQ should not have used the incomplete MRH. The MSQ used the parts from the incomplete MRH to repair the MRH in use. From the financial standpoint, it is more acceptable for the MSQ to divert the parts from the incomplete MRH to fix the broken MRH and repair the aircraft on-hand instead of waiting to fix the malfunctioning MRH until a complete MRH can be provided. The incomplete MRH did not serve the originally intended purpose of the proposal, but became a supply parts donor instead. By doing this, JMSDF has wasted too much of their budget in terms of increasing operational availability. With the budget for the incomplete MRH, JMSDF could have purchased other parts for supply. The budget, however, used for the incomplete MRH resulted in most of the parts from that MRH being housed in warehouse without being used.

For the reasons outlined in this section, the policy failed to meet MSQ's goal of increasing operational availability. These kinds of situations have shown up again and again, and thus as a whole organization, JMSDF seemed to change their scope from "maximizing operational availability in the operational demand level" to "operators limiting their demands to the level that logistics can supply."

F. SUMMARY OF ORGANIZATIONAL BEHAVIORS

What organizational systems and system dynamics consistently impact JMSDF's problem solving behavior? A hierarchical culture is strongly rooted in the two chain-of-command systems, operators and logistics, which cannot sufficiently understand lateral organizational coordination and communication requirements to meet mission goals. In addition, the chain of command is structured in such a way that issues are addressed from a short-term point of view at the MSQ level, but from a long-term point of view in the

upper department, ASD, MMC and MSO. Thus, the countermeasures taken to solve problems such as the need for increased MCH operational availability do not produce noticeable impacts on the overall system.

This organization owns a considerable number of overseas-produced “specialized” aircraft (“specialized” in the sense that very few of the same type are produced), such as the MCH-101. This significantly increases the cost of aircraft repairs and the volume of work, such as converting almost everyday parts from one aircraft to the others because of lack of parts.

The negative impact on the systems can be described as follows:

- Even though it was obvious that MCH-101 would have lower operational availability from supply and maintenance than JMSDF expected, no one wanted to respond to this problem because everyone working for the MCH-101 was too busy, and thus tried to escape or just react only in superficial ways.
- The MSQ wanted to develop a proposal to solve the MCH-101 problem, but its solution was not plausible because various key stakeholders who needed to be part of the solution were not consulted.
- The more efforts the MSQ makes to solve the MCH 101 problem, the more likely it will receive other jobs from MSO, headquarters, because headquarters believes that this is their standard level of maintenance performance. Therefore, the MSQ feels that it is better not to react to the problems.

These negative impacts show how difficult it is for the MSQ to increase MCH-101 operational availability from its current problem-solving perspective. Therefore, the MSQ needs to think about the problem from the perspective of the whole organization and the other external stakeholders’ perspectives. JMSDF needs to adopt the same internal and external systems perspectives to tackle the problems, which require that both MSQ and JMSDF to work together actively to rethink their MCH-101 problem-solving approach.

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IV. APPLYING SYSTEMS THINKING AND THEORY U TO THE JAPAN MARITIME SELF-DEFENSE FORCE: AN ILLUSTRATION

The Japan Maritime Self-Defense Force (JMSDF) aircraft supply model requires a systems-thinking approach because the situation that MCH-101 is out of service due to the lack of parts is often a daily routine. To overcome the mental model that creates this routine problem and recognize the circular system causing the problem, we apply the systems thinking-based framework of Theory U to the case of an aircraft supply system for MCH-101. MSQ conducts maintenance and supply for the MCH-101, and represents the perspective of the primary observer; the logistics and operator perspectives are also discussed.

This study determines if the aircraft supply system problem can find innovative solutions and insights through exploring the thinking process within the Theory U framework rather than coming up with a specific solution. To reach specific solutions, the involvement of stakeholders is required. Each step should be led by a facilitator who has expertise and knowledge in the field of Theory U. Participants should include at least 20 stakeholders from MSO, MMC, ASD, MSQ, SF, AF, AW, FQ, suppliers and vendors for MCH-101, and the facilitators should create a dialogue beforehand to foster a spirit of joint ownership as a necessary meeting outcome.

A. HOW TO AVOID “DOWNLOADING”

The cited attention level of “me” examines problems from a personal perspective and from the perspective of the MSQ. The attention is focused on self, rather than on the event. Figure 25 shows MSQ’s reaction to a specific event—an aircraft is out of service because of a lack of parts. The MSQ reacts either routinely or even apathetically toward the event, with the response, “So what? It is none of my business,” or, “I have seen this before.”

The situation where MCH-101 is out of service from the lack of parts is a routine, often daily, occurrence for MSQ. Consequently, MSQ does not perceive the lack of parts as an unusual problem, and treats it in a superficial way.

Attention I in “me”
Perspective of “me”
“So what?”

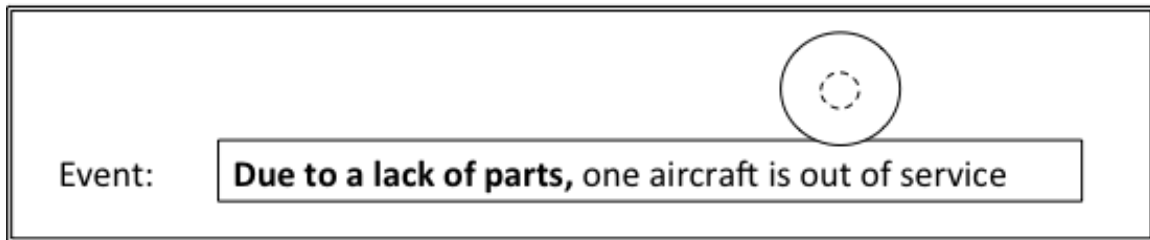


Figure 25. Attention: “Me” with Respect to Aircraft Supply.

These reactions reflect the process of downloading because the situation where one aircraft is out of service because of a lack of parts is a routine, often daily, occurrence. The problem is not perceived as unusual, and a by-the-book response is given. However, as the lack of parts problem escalates (operational availability decreases to the extent that pilot training and normal duties cannot be sustained), the ultimate result could be a significant increase in the risk of a fatality.

Theory U suggests a temporary suspension of the Voice of Judgment (VOJ) and the maintaining of an open mind—a state in which the repetition of past thought patterns is halted, and new ways of thinking are accessed to avoid the process of downloading.

B. SEEING

The attention in this state is on “it,” and reflects a state in which an individual is transfixed on events transpiring in his or her vicinity. Figure 26 shows a different reaction from the MSQ to the parts problem. Although from the same perspective of “me,” the MSQ sees this action as external to personal judgment. The MSQ’s attention is on “it,” the event. Therefore, the MSQ recognizes a future where the response to operator demand may no longer be possible. The MSQ perceives a potential problem.

Attention I in “it”
Perspective of “me” without individual judgment
“Perception of a potential problem.”

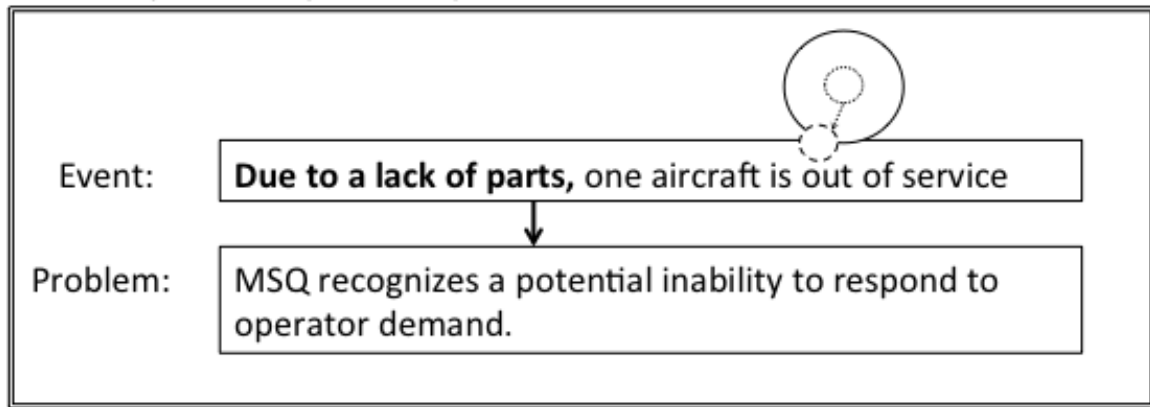


Figure 26. Attention: I in “It” with Respect to Aircraft Supply.

When the MSQ is in a state of seeing, whether spontaneous or forced by a critical situation, a linear system is produced. Figure 27 presents a linear system for the case where one aircraft is out of service because of a lack of parts. The situation creates a counter reaction that places an urgent requisition with the MMC, ASD for parts, and all possible alternatives. This figure shows the development process of the linear system.

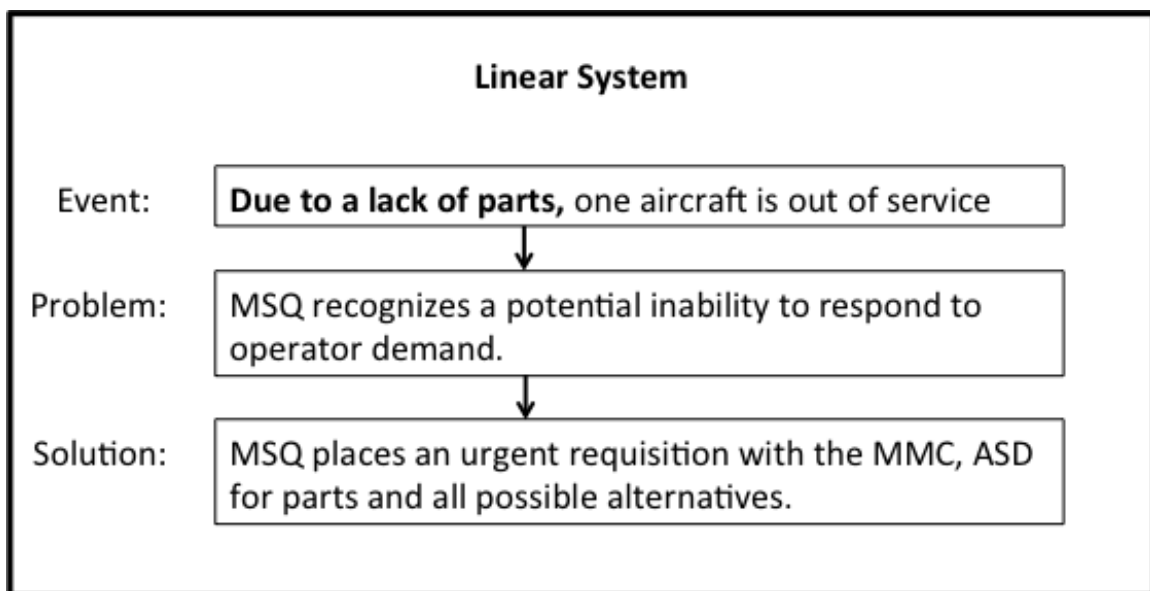


Figure 27. A Linear System in Aircraft Supply.

Simple technical problems can be solved using such a linear system, which is created by a seeing state with a temporary suspension of the VOJ and maintaining an open mind. The problem can then be recognized and solved before it becomes serious. The temporary suspension of an individual's VOJ and an open mind may facilitate earlier recognition of danger signals.

However, the underlying problem concerning the MSQ's approach is not resolved, and the MSQ will repeatedly face a similar problem. This logistics model has contributed to a chronic problem concerning the supply of parts.

C. SENSING

With respect to the third attention state, I in "you," the MSQ takes an empathetic perspective. This facilitates MSQ's understanding of the conditions of other stakeholders and the perspective of the operators and higher logistics department. This empathetic perspective is beyond the MSQ's boundary, as depicted in Figure 28.

Attention I in “you”
 Perspective of “you”
 ” I understood your situation and what you are saying.”

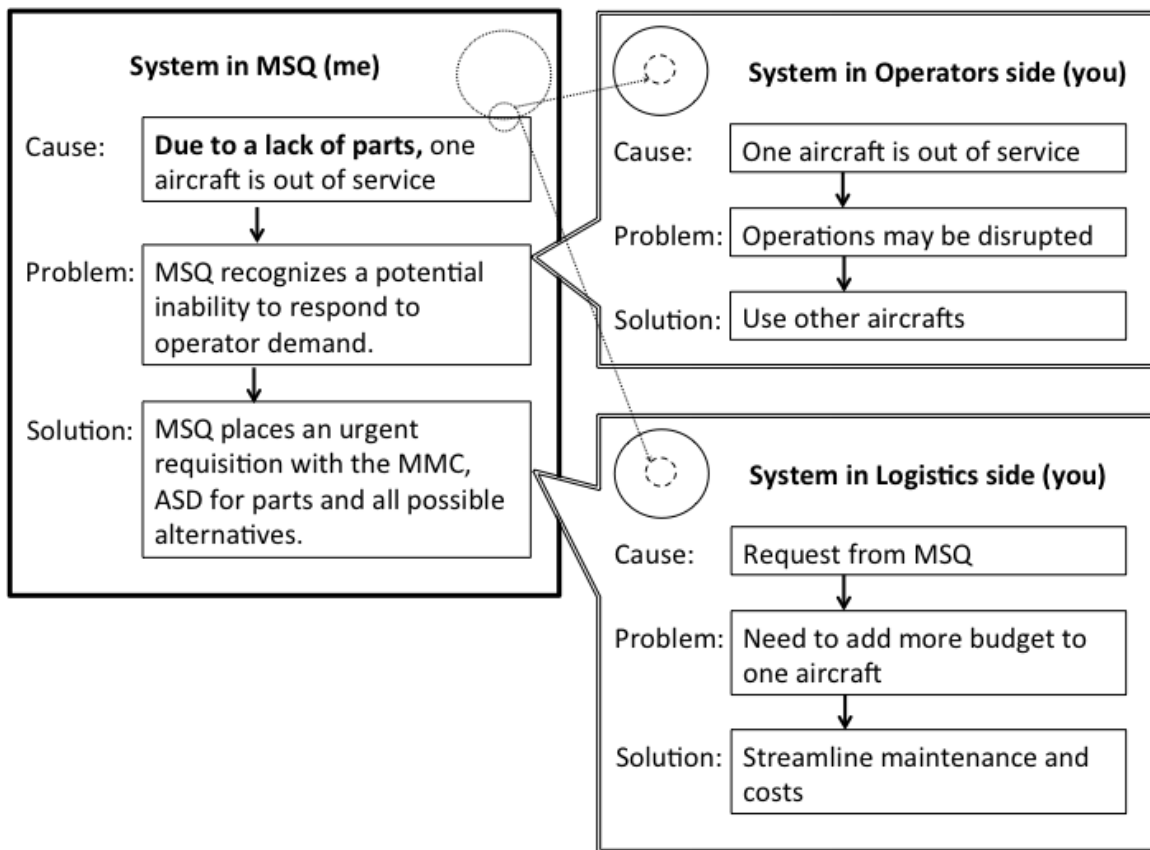


Figure 28. Attention: I in “You” with Respect to Aircraft Supply.

As the problem escalated, it becomes necessary for the MSQ to conduct adjustments on both the operator and the logistics side. The Theory U framework allows the MSQ to react to this problem before it becomes serious or before another department orders MSQ to react to it.

Theory U requires the temporary suspension of the Voice of Cynicism (VOC) and requires an open mind. VOC represents the cynical or pessimistic feeling generated from a mental model developed from prior experience. For example, in this case, MSQ has the mental model, “MSQ may be told by logistics upper command chain that no budget exists to remedy the parts shortage or that foreign aircraft take time to repair.” This model is coming from MSQ’s past experiences. It might create the cynical or pessimistic feeling

that “MSQ cannot fix the problem even though MSQ does understand that logistics should simply comply with operators’ demands.” This feeling reflects the dominant logistics mental model.

By suspending the VOC and maintaining an open mind, an awareness of others and a process of sensing begins. Understanding others is less a focus on others’ opinions as an understanding of the circumstances that led to the formation of those opinions. If possible, it is desirable to create a genuine understanding of the MCH-101 problem circumstances through face-to-face dialogue with people in MSO, MMC, ASD, MSQ, and FQ. If face-to-face dialogue is impossible or impractical, a written description of the stakeholders’ understanding of the problem can be used as a second alternative. The content should describe the stakeholders’ circumstances related to problem to make other people understand why and how they form these opinions. This written document helps other people understand and sense the situation that caused their opinions.

With these ways of sensing, MSQ will understand others’ opinions and can react to the problem quickly without being influenced by its VOC. For example, MSQ understands that operators require aircraft to conduct their missions and that logistics requires the optimization of maintenance and costs to ensure consistent budgets. Problems resulting from these requirements can be quickly reacted to without energy and time being wasted because of the VOC.

However, the fundamental problem that requires the MSQ to change is still not resolved, as described in Chapter III. Each department is responsible for different duties. Therefore, one department cannot predict the optimum demand for another department or comprehend the long-term influence its activities can create across the department. Some problems are too complex for even executive-level leaders to be able to resolve. Therefore, every department must conduct team learning as a whole, and identify the dysfunctional circular system created by a mental model not robust enough to solve the MCH-101 problem.

D. PRESENCING

With respect to the attention level of presencing, the attention is at an all-encompassing state of “now.” The MSQ has an understanding of the real systems behind the problem, as shown in Figure 29. It is apparent that each department is responsible for the undesirable results themselves because of the circular system. Every department can start to think about innovation that JMSDF usually could not make.

In the case of the aircraft supply model, the Voice of Fear (VOF) requires that every department bear the risk of creating something that is not an extension of the past. This can lead to fear of loss of identity. There may be a feeling caused by the VOF that the MSQ never says no to the operators; however, for change to occur, MSQ must start to say no. There may be the perspective that the moment an individual in MSQ says no, workload increases to change the system. Similarly, some may feel that the MSO does not abandon set plans; however, because the present situation is different from the plan, the MSO must recognize that the present system will not enable the new MCH-101 to fly the required training missions. Some operators do not complain about the MSQ because they know that some members of MSQ are already overwhelmed. However, if pilots do not train, they will lose their license to fly.

Temporary suspension of departmental VOF facilitates an open will. If each department makes the intellectual room to focus on the perspective as a whole rather than from that of individual departments insisting on maintaining individual advantage, a presencing state can be established. This facilitates the realization that the measures currently being taken are causing the problem.

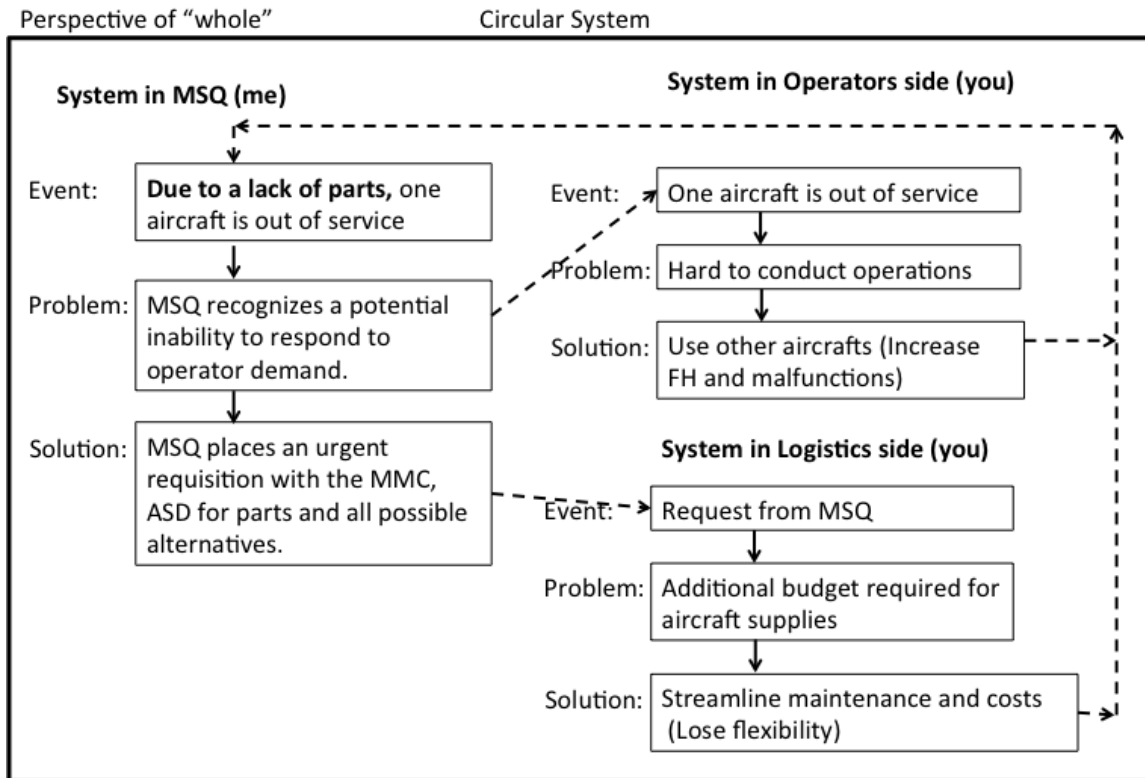


Figure 29. Attention: I in "Whole" ("Now") with Respect to Aircraft Supply.

In the presencing state, all stakeholders can see the circular system. In the current system, the measures that each department took ultimately exacerbated the fundamental problem in this supply model. With respect to the operators, as aircraft flight time of alternative models increases to compensate for the inability to fly certain aircraft, additional malfunctions compound the situation. Malfunctions cause an additional lack of supplies. With respect to logistics, although maintenance and cost are optimized, the logistics system becomes less flexible. Deficiencies in flexibility cause an additional lack in supplies and compound the problem.

The self-reinforcement of this problem is illustrated in Figure 30. Each department takes routine, habitual measures to solve the problem, but as they do so, the underlying cause of the problem remains unresolved, and, in fact, the problem worsens. Because of a delay in problem resolution, recognizing a negative circular system of self-reinforcement is difficult. Almost all chronic problems reach this state. Therefore, the search for the circular system becomes a useful countermeasure. Additionally, once the

circular system is identified, the root causes of the actions that created the circular system also become visible. In Figure 30, VOF is displayed, showing the fear that if departments point out the root problems, an increase in workload will result. This VOF caused an uncommitted approach to solving the problem. Because stakeholder workload for the MCH-101 was originally very heavy, it was difficult for them to diagnose the root cause of the MCH-101 parts problem, even though the problem escalated.

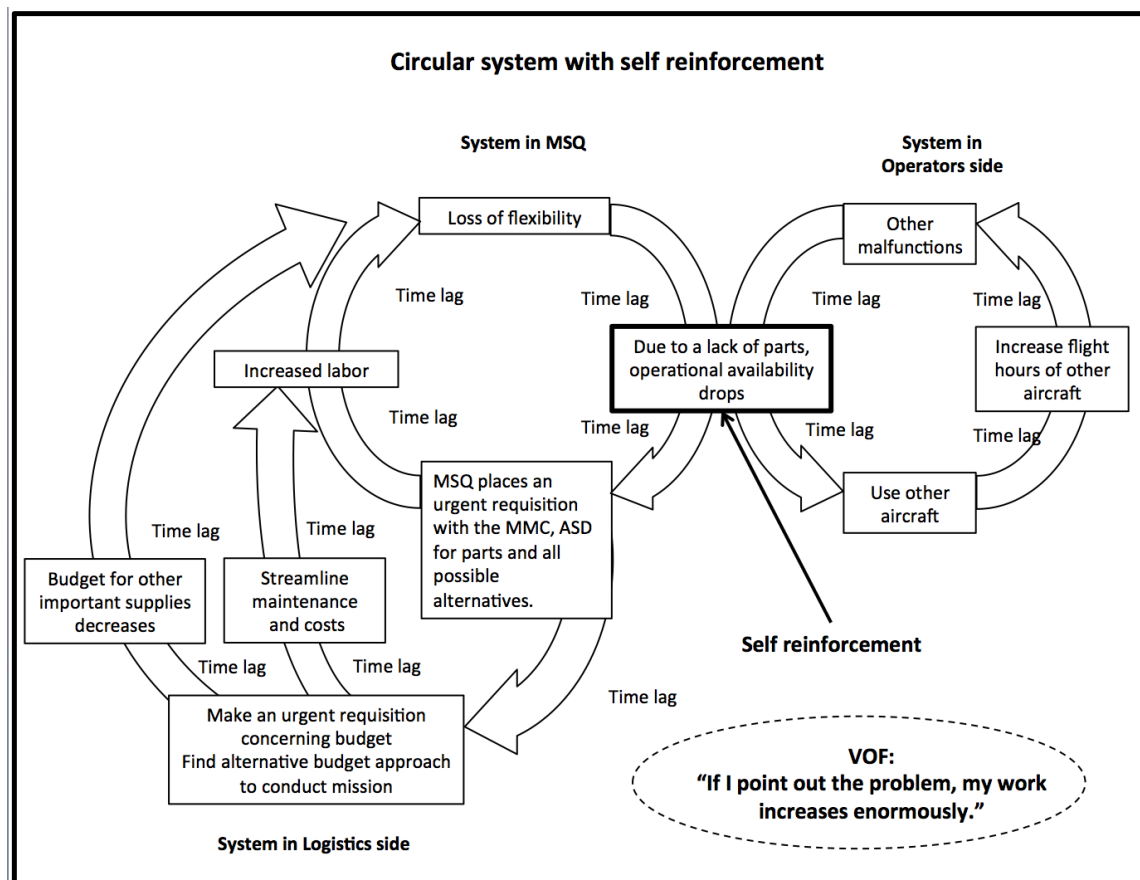


Figure 30. Circular System with Reinforcement in Aircraft Supply.

With this VOF, an individual might have to contend with a temporary, increased workload, but this individual must also realize that the additional workload is a component of rejecting the current system. Consequently, the act of presencing can cause individuals a sense of being unsettled. In this initial presencing stage, there can be worry and even fear about the increased workload and the feeling that their identity and current

role in the department is changing dramatically. But these concerns are often experienced when creating something new or in the process of mastering a very difficult new skill. Additionally, having prepared oneself for the worst situation from this dysfunctional circular system, an individual may try to realize that success results from the spontaneous acceptance of a new idea, not a conscious decision based on habitual decision-making routines.

This discarding or putting on hold past experiences and the mental model processes that organize and interpret those experiences can end defensive, self-protective remarks, and mutually critical remarks that shift the blame to others, as was the case in the previously discussed NASA example. Instead, constructive discussions that focus on changing identified circular systems that have become the norm can be a possible outcome from the application of Theory U. Finding the circular system, determining the root causes of problems, and making explicit dysfunctional mental models are the most significant results from the application of Theory U.

E. CRYSTALIZING

In attention level “you,” each stakeholder in this aircraft supply model is committed to generating the core direction required to make clear current ideas and help problems solvers act across their boundary of each department.

Here is an example of an actual Theory U course that is conducted in Japan (Nakadoi, 2014). After arriving at presencing and an understanding of the circular system, as well as learning that worry and fear is not unusual, a quiet period is observed. Program participants have also learned how to use this quiet period to advantage. The duration of the quiet period is decided by the participants, as is the topic of discussion, and ranges from one to two minutes or longer. For difficult problems, such as this JMSDF case, over 30 minutes is desirable. It is possible to move around during this time, but communication is not permitted. Individuals are asked to think about whatever they are internally experiencing.

The participants are then asked to draw any image or express any feeling coming to mind that can be recognized through the five senses. The meaning of the drawings or

feelings is left for later consideration. If a participant is unable to draw an image or express a feeling related to one of the five senses, an individual can select from a pile of hundreds of theme-less photographs. An idea related to a sense of personal, societal, or organizational values is developed from the drawing or photograph. Similar ideas can arise by considering one's contribution to society, how one communicates with the world, or the reason for one's existence.

One then thinks about the meaning of the image and interprets the image that has been drawn, the feeling that has been expressed, or the photograph that has been selected. This is an important process for producing a new perspective. For example, the core direction can be a perspective that determines priorities such as "operations first," "budget first," "balance of human and equipment first," or "balance of budget and operations first" in this MCH-101 logistic model. Every stakeholder can have its own core direction. Through the later processes—prototyping and performing—different core directions from stakeholders can be changed, developed, and integrated into one direction.

The typical core direction without the process of presencing can end simply with policies or written decisions that no one attempts to obey in a difficult situation, as was the case in Mitsubishi Fuso Truck & Bus Corporation's car recall concealment. The core direction made through the presencing state will be kept as the norm even during difficult situations like a temporary increase in workload, because these new core directions are created without mental model VOF, as in Figure 30. This is a possible outcome from the application of Theory U.

F. PROTOTYPING

Attention level "it" involves the prototyping of the inspiration and ideas derived from presencing. The MSQ and each stakeholder react from their own boundary. Prototyping requires that the MSQ has ideas and inspirations derived from presencing.

Core directions such as "operations first," "budget first," "balance of human and equipment first," or "balance of budget and operation first" in this MCH-101 logistics model that have been derived from crystallizing are managed in a purposeful way. Each department divides itself into teams according to their various core directions, and

improvises models to put core directions into practice with a vision or image different from past mental models that contributed to the root cause of the MCH-101 problem. Each time a model is created, participants receive feedback with the cooperation of other teams without any cynicism and fear.

If one concrete solution like new purchases of main rotor head for MCH-101 is adopted in solving the problems, the prototyping ends quickly. Therefore, reconciling different prototype models and trial-and-error processes to test the prototype are required. During feedback, the point is not to spot problematic areas, but to ask exploratory questions about the model. If each department did not experience the presencing state, these comments can be overly critical or even sarcastic because they do not have the understanding of others' opinions or the intellectual and psychological space to try to receive other's opinions.

By expressing the image as a model, communication that goes beyond experience or expertise can be achieved, and consensus building can be promoted, as was the case in the Hastily Formed Network (HFN) problem (Denning, 2006). Any material or method can be used to create a model. Shell's use of the internal knowledge-sharing conference and "Mind map" (Buzan, 2010) are useful starting tools that can help problem solvers visualize on paper an image of the model.

G. PERFORMING

Attention level "me" reflects the condition of putting prototype models into practice. The MSQ reacts inside its perspective or boundary at this attention level. For example, each department starts its part of the procedure in the new model based on the core direction. Typically, without presencing prototype model reactions end with only a repetition of the Plan Do Check Act (PDCA) process within the circular system created by the current, dysfunctional mental model. As a result, without the presencing stage of the process, there is a tendency for the initial intent and energy to generate novel solutions to a complex problem to gradually dissipate because of negative judgments—the VOJ.

To get a sense of unity based on the understanding of the whole perspective and attention, the MSQ must be inspired by the presencing and also practice the presencing techniques. It is also important to reach the presencing state by observing silence, and by engaging in reflection and dialogue on a daily basis. For example, MSQ can conduct this procedure daily through an After Action Review (AAR).

Through use of the Theory U process, the leadership of the MSQ or MSO can sense the motivation of each team and department and work hard to enable their coordination, rather than to control or manage them. This results in collaboration. With Theory U process, individual stakeholders can feel unity as a whole group and understand the importance of their maintenance and supply tasks. Therefore, they can adjust their work according to ideas they acquired in the presencing state.

H. SUMMARY

Through the Theory U process, managers begin to take personal responsibility for the choices they make, as well as the results of those choices, and thus, a healthy sense of pride and confidence towards one's self and work develops. As a result, overdependence on organizational routines and typical problem-solving approaches decrease significantly. When making choices unaffected by the past, a different sensibility to problem solving develops. One is able to immediately accept even concepts that run contrary to common sense and discard common sense that is no longer needed. After finding the circular system, each department can work in effective ways that involve and motivate all stakeholders, making them feel a sense of unity without negative judgment, cynicism, and fear.

1. Advantages

The practice of Theory U and avoiding the process of downloading can increase the speed at which the real causes of a problem are recognized, increase the likelihood that unnecessary antagonisms can be avoided, and improve effective work communication even with the complicated logistic model for MCH-101.

When the current format for meetings and communications is transformed according to the Theory U format, cross-organizational understanding, and the communication between higher and lower chain of command levels, and the managerial and operational functions in each command, can be increased in JMSDF. This is significant in recognizing problematic and dysfunctional systems.

Theory U can help an organization take steps toward the state of presencing, and it can identify the circular system that creates chronic problems, without undue pressure caused by a crisis or scandal, like the loss of a pilot's license caused by non-mission availability for the MCH-101. When this occurs, defensive, self-protective, and mutually critical remarks that shift blame will end, as was the case for NASA. This approach can change continuously the structure and preparedness of an organization toward achieving multiple goals as the internal and external organizational environment changes. Additionally, trial projects show that high-quality cooperation from project participants can create an environment in which PDCA can be practiced naturally and for the long term.

2. Important Consideration

Because the Theory U concept and process is a new idea for most organizations, the successful conveyance of presencing and Theory U in a conference setting requires preparation and a specialized facilitator.

To facilitate Theory U, JMSDF needs to develop their internal knowledge-sharing processes in meetings, conferences, and daily communication, as Shell Oil has done, to meet the military operation's decision-making speed.

Because this process is related to human nature, JMSDF needs to have a return on investment (ROI) analysis methodology to successfully implement a human resource development program that Theory U requires.

V. SUMMARY, CONCLUSION, AND RECOMMENDATIONS

As the Council for Reforming the Ministry of Defense stated, threats are diversified, and it is assumed that complex situations will arise in which things cannot be dealt with solely according to past precedents. Not only that, but in a security environment in an age in which effective, reliable responses are required, an appropriate response, at the right time, is not only desirable but necessary. The JMSDF logistics case for the MCH-101 is merely one example of a complex case. In the future, JMSDF will be confronted with many problems which are complex and cannot be solved only using past problem-solving processes.

What is needed most is not leaders with strong power to pull others along but for everyone in an organization to learn, and to continue transforming themselves, which defines an important element of systems thinking. The role of a leader needs to change to that of a facilitator who prepares a space for problem solving and new idea incubation and maintains that space so that specialists in possession of different kinds of experience can work together as creators of novel solutions. This is exactly what Theory U is meant to accomplish and, as we have seen, is a possible outcome from the application of Theory U to the MCH-101 logistics case.

Theory U and Systems Thinking Is Useful

According to analysis from applying systems thinking and Theory U to the Japan Maritime Self-Defense Force MCH-101 case in Chapter IV, in response to a complex problem that cannot be dealt with by merely following past precedents, Theory U is able to arrive at a robust understanding of the problem, and is able to stimulate solutions. In addition, it can be used to create an environment in which regular work is easily carried out smoothly.

JMSDF and military organizations are “class-based societies” that act according to orders from the higher rank and command chain, and they possess a culture that seeks swift action following prescribed codes. For this kind of hierarchical organization, Theory U is a useful technique for transcending powerful vertical and horizontal

structural constraints and gaining wisdom. Also, even in a situation such as the loss of the command system, if the entire organization responds while engaging in incremental learning, the organization is able to maintain its capacity to accomplish its mission as in the case of HFN (Denning, 2006).

How to APPLY Theory U and Systems Thinking To JMSDF

To apply Theory U, education in organizational behavior of the systems thinking and Theory U type, which “builds organizations that create the future they desire through self-learning and problem-solving,” (Nakadoi, 2014) is needed. This education is needed because the Theory U concept and process is a new idea for most organizations. Furthermore, building leaders who can demonstrate this capacity in the workplace becomes absolutely imperative.

Recommendation

The existence of complex dynamic problems, like the low mission availability of the MCH-101 due to its current logistics model, requires managers to change their mental models and their typical problem-solving approaches. These managers require new social science theories, tools, and techniques to solve such problems. These new theories, tools, and techniques should be mandatory in JMSDF management education. Specially, systems thinking and Theory U can be good guidebooks for JMSDF not only because they are used by many leaders in the world, but primarily because they contain the tools to develop human nature and to solve problems JMSDF will increasingly have to solve in the future.

To implement Theory U, JMSDF needs to develop internal knowledge-sharing processes in meetings, conferences, and daily communication to meet the military operation’s decision-making speed.

To objectively assess the value of Theory U, JMSDF needs to analyze its return on investment.

Useful information can be gained by participating in SoL, which is based on systems thinking, or the Presencing Institute, which is based on Theory U. They provide

many workshops. Systems thinking and Theory U can be practiced inside an organization by participating in regular workshops, or by inviting a facilitator to manage problem-solving processes.

Theory U helps managers solve complex problems in a novel way. It does so by creating innovation that is naturally based on systems thinking, which focuses on the necessary elements of human nature and attempts to study and transform the self. This theory differs from the usual management tools because it transfers one's attention to something large and beyond one's perspective, and attempts to overcome the boundaries created by personal and organizational mental models and past experiences. Theory U stands out from the conventional methods because the process of discarding past experiences gives inspiration for innovative solution. Ultimately, Theory U helps generate the action needed to implement the novel concept, process, or product.

Theory U can be used by the Japanese Maritime Self-Defense Forces (JMSDF) to improve the communication within the organization, to find the root cause of complicated problems like the MCH-101 logistic problem, and to solve them in effective ways that involve and motivate all stakeholders, making them feel a sense of unity. Theory U is both a desirable and necessary approach to developing human nature, solving JMSDF's future problems, and making effective, reliable, and appropriate responses to everchanging threats.

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